Australian Personal Computer

ISSN—4115 NZ $6.75 INCL. GST
REGISTERED BY AUSTRALIA POST PUBLICATIONS VBP 3691

MAY 1990 $4.95

AUSTRALIA'S TOP SELLING COMPUTER MAGAZINE

THE POWERFUL 486 BLOWS AWAY OUR BENCHTESTS

Spreadsheet showdown ● Windows 3.0 ● Program animator

From the people who make Europe's highest selling Laser Printers in their class

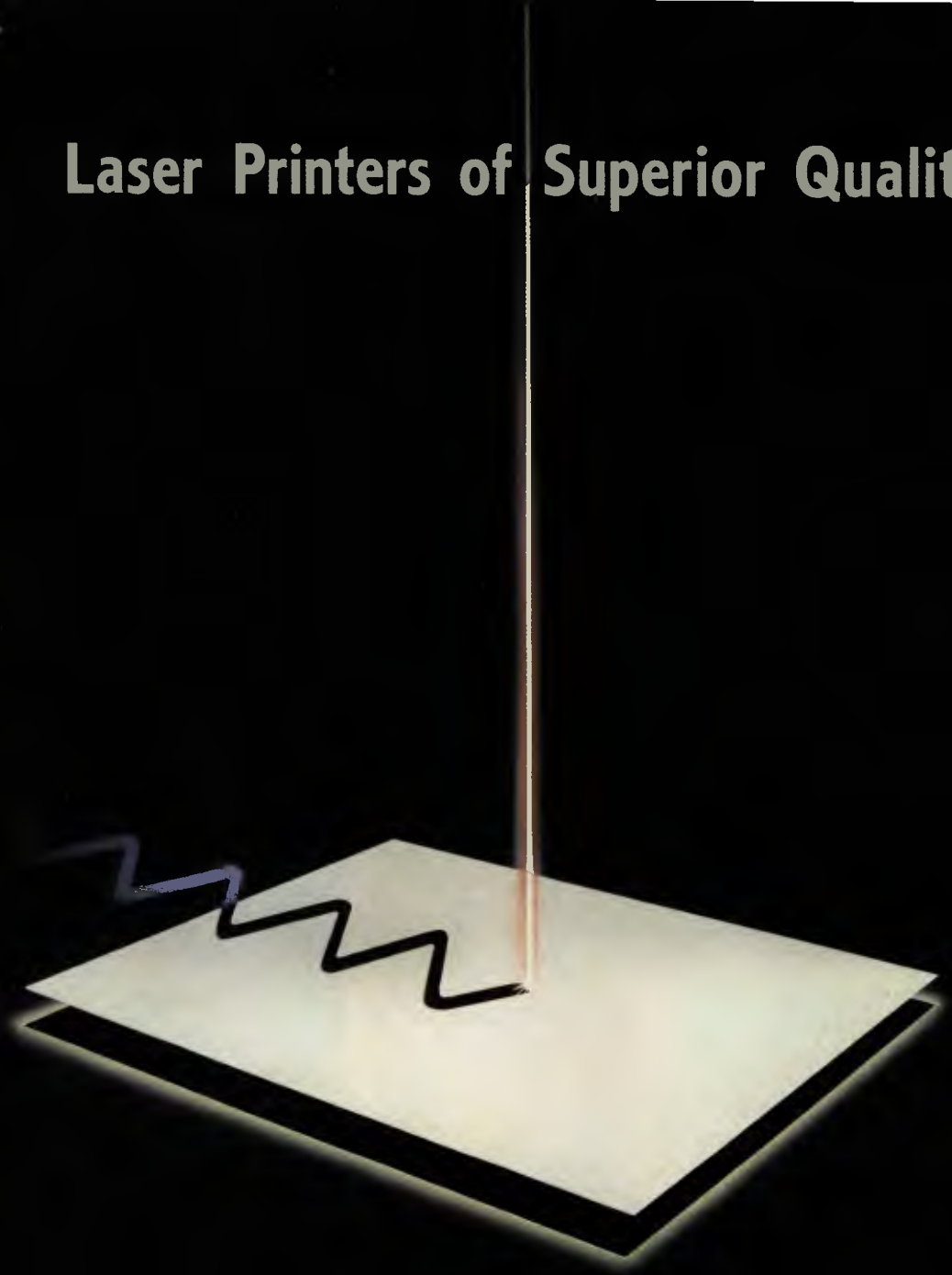
That's Kyocera. Of all the machines in the 10 to 20 page per minute category, Kyocera outsells its nearest competitor in the European market by nearly two to one*. The reason is simple, Kyocera is a superior machine. Right across the range they offer more of virtually every important feature. More emulations, more resident and dynamic fonts, more bar codes, even I.C. cards that can be customised with your own logo, forms or signatures.

Shouldn't you find out more about Kyocera? Phone or fax for full details today.

*IDC figures published 1989.

Intergroup 1838

Laser Printers of Superior Quality



KYOCERA

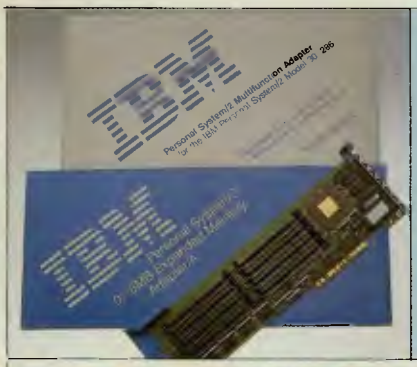
Kyocera Electronics Australia Pty Ltd, Unit 19B, 175 Gibbes Street Chatswood NSW 2067 Telephone: (02) 417 8977 Fax: (02) 417 7504

ATTENTION: DEALERS AND CONSULTANTS:

ORDER NOW — Memory Mod

• DEC MICROVAX 3800 • PRIME 2950 • IBM AS400/B40 • HEWLETT PACKARD 3000925 • AMSTRAD • MITAC •

• SILICON GRAPHICS • INTERGRAPH • PYRAMID • CONVERGENT TECHNOLOGIES • APOLLO



Genuine IBM Memory Cards

The 6450605 suitable and recommended in the 386 PS2 series whilst the 6450609 suitable and recommended for the 286 PS2 series. Should you require any IBM board or part please do not hesitate to call.

6450605	$1550	Call for 10 + PRICING
6450609	$1500	Call for 10 + PRICING
1497259	$ 750	Call for 10 + PRICING

DRAM-SRAM

(Major Japanese Product)

1 MEG DRAM	41000 — 80NS	$10.50
256 x 4 DRAM	44256 — 80NS	$10.50
256 x 1 DRAM	41256 — 120NS	$ 2.50
64 x 4 DRAM	4464 — 100NS	$ 2.60
64 x 1 DRAM	4164 — 100NS	$ 2.60
32 x 8 SRAM	5256 — 100NS	$ 7.50
64 x 4 SRAM	5188 — 35NS	$ 6.50
1 MEG EPROM	271000 — 100NS	$ 9.00
256 x 4 ZIP	442256 — 80NS	$10.50

Memory Cards —

AT, 386 & Micro Channel

Provides up to 32MB using 4MB SIMM, 8 MB using 1MB SIMM or 2MB using 256KB SIMM. Compliments high speed processors like 286 & 386 by offering E.M.S., E.E.M.S. and the ability to backfill. Comes complete with memory manager software. Operates LIM4.0 ideal for networking, OS2, UNIX and CAD.

AST Rampage	$386	Call for 10 + PRICING
ORCHID Micro Channel	$480	Call for 10 + PRICING

Ramjet Laserprinter Memory

To suit HPII, HPIID, HPIIP, HPIII, CANON LBP-8 SERIES and OLIVETTI. 1, 2 or 4MB on the one multi mode board. Postscript also available.

1 MEG	$ 330	call for 10 + PRICING
2 MEG	$ 410	call for 10 + PRICING
4 MEG	$ 570	call for 10 + PRICING
POSTSCRIPT	$1150	call for 10 + PRICING

DEC Memory

MS01-AA	4MB Upgrade DEC Station 3100	$1150
MS42-BA/NN	12MB Upgrade VAX Station 3100	$3750
MS42-CA/NN	16MB Upgrade VAX Station 3100	$4500

Phone for price and availability on other DEC products.

• IBM • SAMSUNG • AST • HEWLETT PACKARD • APPLE MACINTOSH • A.T. & T. • ACER • BRISTOL • NEC •

SIMM Modules (Edge Connector Type) SIP Modules (PIN Type)

Now available is 4 Meg, 1 Meg and 256KB in either SIMM or SIP configurations. Manufactured by major Japanese Company, the modules go through extensive quality control, including unit failure tests (to check the drams on the modules). Furthermore every board is baked for four hours to eliminate any possibility of a dry connection and there's a 24 hour test (installed in test unit) for quality control on performance. All products are 100% compatible and won't interfere with military frequency bands, therefore they perform 100% in military equipment.
E.C.I. also carries drams used in the population of Motherboards or Memory Expansion Cards that use dram chips and not SIMM or SIPP Modules. For computers tht cannot be expanded any further on the Motherboard we supply an AST Rampage Plus Card for use in the 286 (AT style) or the 16 bit slot in a 386 machine.

As they use 8 bit SIMMS with a parity chip they have to be installed in pairs and therefore can be populated for 512KB up to 2 Meg using 256 X 9 SIMM Modules from 2 Meg up to 8 Megabytes using 1 Meg X 9 SIMMS or from 8 Meg up to 32 Megabytes using 4 Meg SIMM of extended or expanded memory with backfill. We also supply a 16/32 Bit Micro Channel Card and the same specifications apply to this as with the AST Rampage Plus 286, expandable to 2 Megabytes using 256 X 9 SIMM, 8 Megabytes using 1 Meg X 9 SIMM and 32 Meg using 4 Meg SIMM.

ules, Chips & Boards!

ECI

Major credit cards welcome

ULTRA • TOSHIBA • WYSE • ALR • OSBORNE • PHILLIPS • IBM • COMPAQ • AST • HEWLETT PACKARD

• AMSTRAD • MITAC • ULTRA • TOSHIBA • WYSE • ALR • OSBORNE • PHILLIPS • EETO •

IBM PS/2 Series MEMORY / H.P. 486 MEMORY / AST Cupid MEMORY

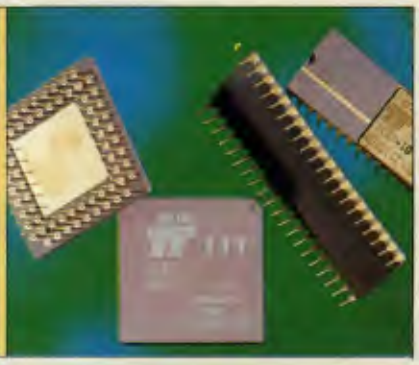
6450603	PS2 70-E61-121	1MB	$220
6450604	PS2 70-E61-121	2MB	$350
6450608	PS2 70-A21-A61	2MB	$350
6450379	PS2 80-111	2MB	$550
30F5348	PS2 30-286	512KB	$120
30F5360	PS2 30-286	2MB	$300
H.P. #D2150A	HP 486	1MB	$260
H.P. #D2151A	HP 486	4MB	$900
AST #500-718-002	AST 386-25/33 & SX	1MB	$195

SIMM & SIP
(Major Japanese Product)

1 MEG x 9 — 100NS	$100	Phone for 20 + PRICING
1 MEG x 9 — 80NS	$115	Phone for 20 + PRICING
1 MEG x 9 — 70NS	$145	Phone for 20 + PRICING
1 MEG x 9 — 60NS	$155	Phone for 20 + PRICING
256 x 9 — 100NS	$ 35	Phone for 20 + PRICING
256 x 9 — 80NS	$ 40	Phone for 20 + PRICING
256 x 9 — 60NS	$ 55	Phone for 20 + PRICING

IIT Math Co Processor

802C87- 8	$260
802C87-10	$280
802C87-12	$330
802C87-20	$390
803C87-20	$480
803C87-25	$580
803C87-33	$700



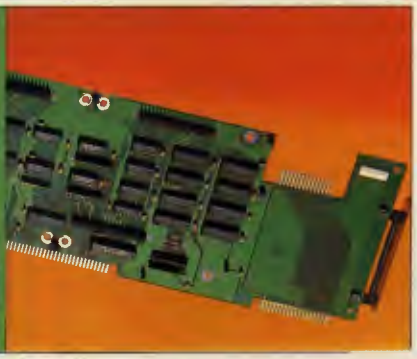
Toshiba Laptop Memory

PA8302U	2MB	T1600	$675
PA8341U	2MB	T3100E	$675
PA8308U	2MB	T3100SX	$775
PA7137U	3MB	T3200	$995
PA8307U	2MB	T3200SX	$675
PA8301U	2MB	T5100	$675
PA8304U	2MB	T5200	$675

Compaq Memory Boards & Modules

	1 Meg Mod.	1 Meg Brd.	4 Meg. Mod.	4 Meg Brd.
386-20	$431	$789	$798	$ 867
386-25	$431	$789	$798	$ 867
386-20E	$431	$789	$798	$ 867
386-S	$431	$789	$798	$ 867
386-E	$431	$789	$798	$ 867
386-16	16 MEGABYTE EXPANSION BOARD			$4250

Phone for pricing and helpful advice on any Compaq not listed.



UNISYS • ZENITH • OLIVETTI • PROFOUND • WANG • COMMODORE • APPLE MACINTOSH • A.T. & T. • EETO •

Dealers & Consultants: Post this coupon urgently to either of the addresses shown below to receive our monthly wholesale price list.

Name ..... Position ..... Company .....

Address .....

SYDNEY (02) 369 1611
MELBOURNE (03) 525 2266

ECI

Enhanced Computer International Pty Ltd
Level 2, Suite 6, 620 St. Kilda Rd, Melbourne Vic. 3004
Telephone (03) 525 2266 Fax (03) 525 1592
Level 5, Suite 8, 1 Newland Street, Bondi Junction, Sydney, NSW 2022
Telephone (02) 369 1611 Fax (02) 389 2893

Contents

Volume 11 Number 5, May 1990
Cover Photography: Rob Blackburn

REGULARS

COMPUTER JOURNAL OF THE YEAR

7 NEWSPRINT

The big news this month is the shock announcement of a merger between Lotus and Novell. Other news stories include Atari's latest offering to the small business market; Australia's landmark piracy case; and developments in image compression.

27 FIRST LOOKS

What's new? Latest releases this month include:

- **Windows 3.0** Extending the life of DOS.
- **Paradox Engine** Paradox 3 database technology for C programmers.
- **Object Professional** Helping to build your own programs for Turbo Pascal 5.5.
- **Microsoft Works 2.0** A cheap but useful integrated package for home and small businesses.
- **Desk Organiser and Address Book** Debden's unsuccessful attempt to produce a computerised diary.
- **Applause II** A step further in DOS-based presentation graphics.
- **Aldus PrePrint** A professional colour finish for Macintosh desktop publishing.

49 TWO BITS WORTH

APC's outspoken columnists ponder the future of scanners; the growing role of powerful PC-based systems; piracy and copy-protection; and a way of tapping into Unix applications while still using DOS.

57 FACE TO FACE

Will it be the battle of the GUIs or will the underlying operating system decide the fate of Windows and PM? Microsoft's Daniel Petre and MicroHelp's Lloyd Borett argue their case.

62 LETTERS

The article on grey marketing in our March issue stirred readers into action.

207 AFTER DARK

If you're not too keen on civilisation, the recently-released Caveman Ugh-lympics may be your solution. If World War II appeals to you more, fly into combat with Their Finest Hour: The Battle of Britain.

213 BIBLIOFILE

Increase your productivity with one of this month's tomes on integrated packages.

217 COMMUNICATIONS

Steve Withers discusses how system operators deal with hackers, and presents the updates in the world of bulletin boards.

222 DIARY DATA

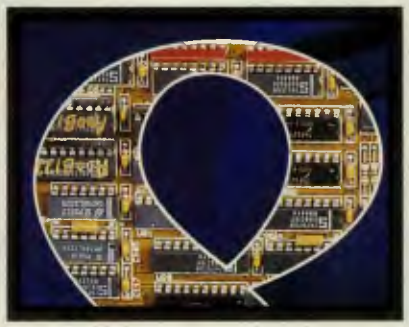
A listing of courses, exhibitions and conferences to jot in your diary.

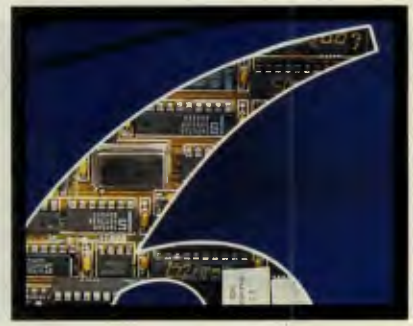
224 MARKETPLACE

231 ADVERTISERS' INDEX

232 CHIP CHAT

The last word of the day.





Managing Editor: Sean Howard; Assistant Editor: Cathie Kennedy; Consultant Editors: Steve Withers and Ian Davies; Editorial Assistant: Sidonie Bouchet; Proofreader: Sharon Weinman; Graphic Artist: Joanne Kummrow, **Advertising:** Gerard Kohne, Iain Aitken and Richard Dickinson (02) 387 3888; Vic, SA, WA and Tas Sales Manager. Julie Dominguez, Marketplace: Vicki Todd (03) 531 8411. Production: Graphic Heart Pty Ltd. **Circulation and Distribution Manager:** Imogen Boas; **Subscription Enquiries:** Debbie Middleton (02) 387 3888; Standard subscription rates: Australia $52.00 per annum, overseas A$110 (surface) A$245 (airmail). Newsstand Sales: Network Distribution Co. 54 Park Street, Sydney 2000.
Publisher: Computer Publications Pty Ltd (a subsidiary of Consolidated Press Holdings Ltd.) **Sydney Office:** Level 17, Plaza II, Bondi Junction Plaza, 500 Oxford Street, Bondi Junction 2022; telephone (02) 387 3888; fax: (02) 387 4617; telex AA 20514 CONPRES. **Melbourne Office:** 122 Ormond Road, Elwood 3184; telephone (03) 531 8411; fax: (03) 525 6125; telex AA 30333 'AMJ'. Printed by Macquarie Publications (Victoria) Pty Ltd.
Material contained within Australian Personal Computer is protected under the Commonwealth Copyright Act 1968. No material may be reproduced in part or whole without written consent from the copyright holders. The articles appearing on pages 7, 153, 161 and 173 are reprinted by permission from BYTE (USA). Copyright © 1990 McGraw-Hill Inc. All rights reserved. The articles printed on pages 27, 49, 65, 110, 183 and 193 are reprinted by permission from PC Magazine. Copyright © 1990 Ziff Communications Company. All rights reserved.

Page 110: Three-dimensional CADD packages

FEATURES AND REVIEWS

65 SPREADSHEET HEAVYWEIGHTS TAKE ON LOTUS 1-2-3

While Lotus was busy re-defining the word 'vapourware' with its long-awaited release of Lotus 1-2-3 version 3, other companies were developing and releasing their spreadsheet packages. But the Lotus offering is still the first choice for a majority of buyers. Craig Stinson presents comprehensive comparative tables and benchtest graphs, and takes a look at how eight leading packages compete with 1-2-3.

- Enable O/A
- Framework III
- Lotus 1-2-3, 2.2
- Lotus 1-2-3, 3.0
- Lucid 3-D
- Microsoft Excel
- PlanPerfect
- Quattro Pro
- SmartWare II
- SuperCalc5

110 3-D CADD

In the final of our two-part special on high-end, three dimensional CADD programs, Kester Cranswick takes a look at two successful Australian packages — Caddsman and Qikdraw — and Jeff Prosise screentests four other packages. Also included is a benchtest graph showing the results of all packages reviewed in the special.

- MicroStation PC
- Personal Designer
- RoboCAD
- VersaCAD/386

130 486 MACHINES EAT BENCHTESTS

Where will it stop? Intel's latest chip, the 80486, has sent most PC manufacturers into a spin developing new machines and rushing them out the door. Neale Morison benchtests six 486s that have recently arrived in Australia.

- ASI 486
- Compwell i486 Platform
- CST Elite 486
- Dolch Portable 486
- HP Vectra 486
- Olivetti CP 486

153 A BETTER dBASE

Ashton-Tate's dominance in the database arena is being challenged by a newly-released product from Fox Software. Steven Vaughan-Nicols tests FoxPro 1.00, and finds that Ashton-Tate has reasons to feel threatened.

APPLICATIONS ARCHITECTURE

161 FROM TTY TO GUI

Many people today prefer a graphical user interface to the command-line interface, but how do the available GUIs compare with each other? Frank Hayes discusses their pluses and minuses. And when you go behind the user interface . . .

173 BEHIND THE SCENES

. . . you come to the application programming interface. Howard Eglowstein explores the next level of detail to consider when you choose a user interface: the capabilities behind it as reflected in the API.

183 SHORT-TERM EFFICIENCY, LONG-TERM PRODUCTIVITY

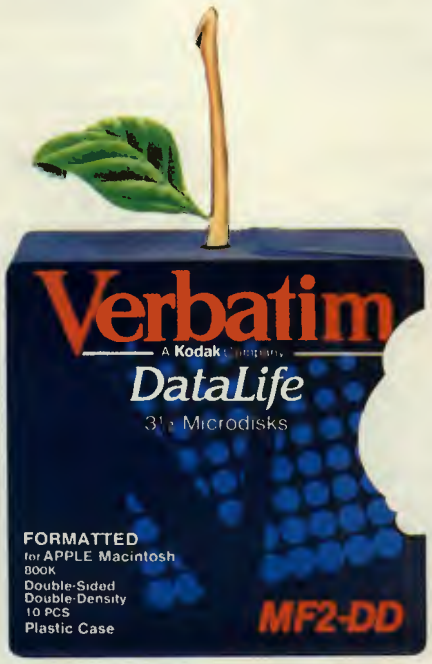
The launch of this regular column compares dBASE-type languages with HLLs for developing database applications.

193 PAN.COM: THE PROGRAM ANIMATOR

If you buy your software 'off-the-rack', you can tailor it to fit your individual work style with PAN. As the uses for this utility are endless, we have presented it in place of TJ's. Next month, TJ's returns in a new and expanded (you ask and we deliver) format.

Supplement: *APC*'s commemorative 10th birthday issue

NOW FORMATTING ON AN APPLE MAC IS AS EASY AS BUYING VERBATIM.



Verbatim are the first to make 3½" diskettes that are specially formatted for Apple Macintoshes.

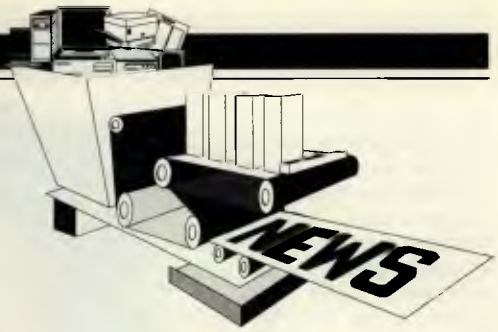
So you don't waste valuable time formatting. And, because you don't have to interrupt a long document to format a new disk, you don't risk losing data.

Verbatim were also the first to produce preformatted disks for IBMs. And they're still the only ones to package these world class disks right here in Australia. You'll find the new Apple Mac diskettes in normal density, 2S/2D, or high density, 2S/HD.

Ask your nearest dealer how Verbatim can be the apple of your eye.

1980 • 1990 Verbatim Australia
A MEMORABLE 10 YEARS

McCarthy Watson & Spencer VB0185



***APC*'s monthly news round-up includes details of the Lotus/Novell merger; Atari's latest attempts to break into the PC small business market; HP's new scientific calculator; Norton Utilities for the Macintosh; and an historic decision by the Federal Court in Australia's first piracy case.**

TrueType vs Adobe: a royal mess for users?

Now that Microsoft and Apple have released more details about their outline font technology for creating smooth, scalable characters on screen and paper (formerly called Royal and now called TrueType), the advantages are still not obvious and are months away from being real.

Many users are asking if there is something 'better' about TrueType that makes it functionally better than Adobe fonts. Looking at the Adobe Type 1 font format and the technical information available on TrueType, it's hard for users to see where either font design has a significant advantage over the other. Both use a set of points to describe the outline of a character. Both use 'hints' (instructions that make characters look good, particularly at low resolution, such as on a monitor or impact printer), although they take different approaches. One apparent difference is that a portion of the TrueType hinting mechanism is independent of the character's outline, and it generally takes more points to describe a TrueType character. TrueType characters and Type 1 characters (rendered with Adobe Type Manager) look equally nice on-screen.

Microsoft and Apple say their approach is faster at rendering characters, and some type designers who have been working with TrueType support that claim. (In a demo given by Microsoft, beta TrueType was noticeably faster than Adobe Type Manager at putting a PageMaker document on the screen.) Regardless, neither type of font will be often rendered.

The computer or printer will construct a bit map from the font format at the proper resolution and then cache it in memory, using these bit maps until the memory is required for a new typeface or a graphic. A small difference in speed between the Adobe and TrueType interpreters probably won't amount to much, since they won't have to do their jobs frequently. This problem might be more acute on a computer system where the interpreter is displaying typefaces on a computer screen, but a large RAM font cache can eliminate frequent reconstructions of bit maps.

Microsoft and Apple originally promised that their new outline fonts would be part of the Mac's System 7.0 and OS/2 2.0, both due later

Windows application bundled with fax board

The problem with Microsoft Windows is that most users still can't do everything they need to within that environment, and jumping back and forth between Windows and the DOS prompt is an outright pain. However, the forthcoming launch of Windows 3.0 will be accompanied by hundreds of new applications, which may well provide the long-awaited missing links for many PC users.

One well-documented deficiency in the Windows armoury has been adequate communications applications, but even these are finally beginning to appear on the scene. Fax Manager, for example, is a comprehensive facsimile management package that comes bundled with the new PureFax board from Melbourne connectivity specialist Powertech.

Developed in the US by PureData, the $1595 PureFax board is a combination fax/modem product that is claimed to be fully compatible with most PC network operating systems. The bundled Windows-based Fax Manager software simplifies fax transmission, reception and viewing. A more sophisticated $3110 network version of the board also includes the Fax Supervisor security control software.

Unfortunately, as with most communications devices designed and built in the US, the PureFax boards are still awaiting official Telecom approval, but Powertech officials optimistically hope to have them available for sale next month.

Ian Robinson

this year. Microsoft announced recently that TrueType will also be part of its Windows environment sometime this year — not in the 'imminently coming' version (the legendary 3.0), but in what will probably be Windows 3.1, said Steve Ballmer, Microsoft's vice president of system software. "If not this year, then next," he said.

Many of the good things that Microsoft and Apple claim about TrueType are of more benefit to type designers than to computer users who aren't typographers. They say that TrueType fonts are easier to develop; it's easier to convert fonts to the TrueType format than to Adobe Type 1 format; and because TrueType is similar to a low-level programming language, it's more flexible and hence more appropriate for non-Roman characters (kanji, in particular) than a high-level language like Adobe's. In a random sampling of people who work on PostScript fonts and rasterisers, we found many who agreed with the claims about TrueType. However, we also found many who said that they'll stick with the Adobe format because it's proven, it's established and in some ways it's better.

But right now, all we can compare is something that exists — Adobe's PostScript fonts — against what Apple and Microsoft say will exist. What Apple and Microsoft have to do is deliver something that works — and works reliably. Microsoft's Ballmer agrees. "The most important thing is for us to show this stuff working across all the promised platforms," he said. "That's the whole point of personal computers: things should just work."

Tom Thompson

Altos joins 486 fray with multi-user offering

For the past few months, the world's PC manufacturers have been falling over each other in the rush to release 486-based systems, but most of these are nothing more than spruced-up versions of old 386 favourites.

Although they promote the new systems as 'super servers', or the ultimate in power user personal workstations, there is very little difference between these 486 monsters and their 386 predecessors — except the price.

Altos Computer Systems has adopted a different tack with its first 486-based machine, which has been designed from the ground up as the ultimate Intel-based Unix host. The Altos 486 System 1000 is the first in a range of 486-based hardware from the Californian Unix systems pioneer, and future models will include systems utilising the EISA bus.

Based on a 25MHz Intel 486 CPU, the Altos 486 System 1000 provides a CPU throughput 50 per cent higher than the older 33MHz Altos 386 Series 1000 unit. The system logic board incorporates 4M of memory, eight serial I/O ports and an I/O processor.

A base system can incorporate up to 630M of internal hard disk storage and a 150M streaming tape backup unit. However, total onboard memory can be expanded to 28M, and the total disk storage can be boosted to over 4G (gigabytes), according to Altos officials.

The Altos System V implementation of the Unix operating system is bundled with the 486 Series 1000, along with custom diagnostic software. Up to 128 serial ports can be linked into the Altos 486 Series 1000, and an Advanced Communications Processor Attachment (ACPA) provides intelligent connectivity facilities to link into local and wide area networks.

Ian Robinson

Lotus/Novell mega-merger takes on Microsoft

Last month's shock announcement of a merger between Lotus and Novell shifted the balance of power in the computing arena, creating overnight a new billion-dollar behemoth that may well challenge Microsoft as the PC industry leader.

The mega-merger combines the world's leading PC local area network operating system provider with the foremost developer of PC applications to the corporate world — together, the two companies can boast more than 15 million users.

The merger, which will not be finalised until July, deals a severe blow to Microsoft, long considered the dominant PC software player. Microsoft has been engaged in a long and hard battle for dominance in networking — an area considered critical to success in the 1990s.

The Lotus/Novell team promises to offer corporate customers a one-stop solution for network applications, operating systems and highly specialised support. "Microsoft has applications and networking software, and now there's more than one company that can provide that," said Jim Tolonen, Novell's chief financial officer.

The merger takes the form of a stock exchange valued at $US1.5 billion. Novell will operate as a wholly-owned subsidiary, retaining its name and its headquarters. The companies have combined their boards of directors. Lotus's chairman Jim Manzi will head both firms, and Novell's chairman Ray Noorda will become vice-chairman of Lotus and sit on its board.

Tools will give Windows a role in multimedia

If multimedia computing were a Hollywood movie, the Macintosh and the Amiga would be the stars, the De Niro and Streep. The IBM PC compatible would be the executive producer, running spreadsheets and taking care of unglamorous business chores.

PC compatibles could grab a piece of the multimedia limelight this year, if developers come through with graphics, video and audio tools for Microsoft Windows. Microsoft and other software vendors have now pledged to develop Windows-based tools for putting together multimedia presentations. These tools would be for recording, encoding and editing audio; scanning,

PC Based Point-Of-Sale Terminal

DEALER ENQUIRIES WELCOME!

IPC Point-Of-Sale Terminal (IPC-POS) combines the transaction speed of an electronic ***cash register*** with the data processing capabilities of an ***IBM compatible computer.***

IPC-POS may be operated as a stand-alone unit, connected to any other computer, or networked.

IPC POS is highly suitable for all retail applications from the smallest shop to the largest department store, chain and franchise groups.

IPC-POS uses a range of software operating under DOS, OS/2, Xenix, Unix and most other systems. We have "off the shelf" POS software solutions available.

IPC-POS houses an "AT" or "386" computer mother-board, fully programmable 126 key keyboard , 9" monochrome monitor, 11 digit numeric or 16 digit alphanumeric customer display, 20MB hard disk drive (option) and a 1.44MB 3-1/2" floppy disk drive.
A wide selection of printers, EFT and scanning options is supported..

Call now for more information

IPC Computer Systems Pty Ltd
37 Higginbotham Road,
Gladesville NSW 2111
Tel (02) 809 6095
Fax (02) 808 3052

Or send this coupon to address above.

Name:.....

Company:.....

Address:.....

.....Pcode.....

Phone: (.....) .....

I am interested in IPC Point Of Sale as a

☐ Dealer ☐ End User

drawing, painting, and manipulating photos and graphics; capturing, editing, and digitising motion video and animation; and editing and indexing text. Some of these packages are already working with the Mac, which suggests compatibility between Mac and Windows applications.

Microsoft has licensed MacroMind's multimedia playback software, Director, for use in a future version of Windows. Director 2.0 produces animation sequences for the Mac II in full colour and with sound. The new Windows version (whose release date has not yet been announced) will be able to play back multimedia presentations prepared on the Macintosh. The same Macintosh files can be played through Windows, the companies said. (They recently demonstrated an IBM PC and Mac side-by-side playing Director 2.0 presentations.) MacroMind and Microsoft have agreed to explore additional co-operative efforts in related areas, including OS/2-based versions of animation run-time software.

"For multimedia to really take off, the industry needs a rich set of software tools from vendors across a wide range of disciplines," said Microsoft's chairman Bill Gates.

Among the companies that are pledging to ship such tools for Windows-based applications by the end of this year are Asymetrix, Autodesk, Corel Systems, Electronic Arts, Farallon Computing, Zsoft, Meridian Data and Micrografx.

David Reed

Mac OS to get print-to-video capabilities

By the end of the year, the Mac OS will incorporate video output capability, including the ability to print a file to videotape. Apple Computer is working with Sony to enable the Mac to write to videotape on Sony video machines that have serial control ports, according to Tyler Peppel, manager of Media Integration at Apple.

Apple wants to integrate sound and video manipulation in the Mac OS so that all Mac programs can take advantage of such multimedia capabilities, Peppel said at a recent conference on CD-ROM. Using a prototype of Mac System software, he was able to move a videotaped sequence to a single slide (created with the PowerPoint presentation program); when he clicked on a video display icon, the slide show ran with full animation and digital sound.

It would be as simple to write to videotape as to print to any other device, Peppel said. First you would select the videotape icon from the Chooser, and then pick NTSC or PAL output and print.

David Reed

Nintendo Power Glove

Mattel Toys has introduced the Power Glove, a new development in game controllers designed for use with the Nintendo Entertainment System.

The Power Glove replaces the mechanical movements of a conventional joystick with free-flowing, instant response in three-dimensional space. Sensors in the glove itself and around the video screen detect hand movements which are transmitted to the control unit. The Nintendo control system interprets these signals and directs on-screen characters and objects.

General manager of Mattel Toys Graham Kerry says he expects Nintendo to triple its market this year. Since its launch in late 1987, Nintendo sales have shown continued growth, with 1989 figures 300 per cent up on sales for the previous year. "Australians of all ages are becoming just as obsessed with Nintendo as their US and Japanese counterparts," said Mr Kerry.

The original Data Glove concept was developed for NASA as part of a 'Virtual Environment Workstation' which is planned for the control of robots in space.

Mattel Toys Australia can be contacted on (03) 645 2422.

ISDN puzzle pieces slowly falling into place

Sceptics are still willing to take bets: which will come first — ISDN or human colonies on Mars? But some observers of the communications industry now say that the Integrated Services Digital Network — which promises high-speed voice and data (including video) transmission over a regular phone line — is finally 'a reality' due to several important developments in the last few months.

Most significant, they say, is that vendors and standardisation groups have finally agreed on the Signal System 7 (SS7) standard for connecting islands of ISDN service to one another through conventional telephone switches. This will allow phone companies to connect the small pockets of ISDN service to one another, even though ISDN itself is not yet operating nationwide.

Another major development is a final agreement on the so-called U-interface that governs the two-wire connections linking customer premises to local telephone lines. With these two pieces of the puzzle in place, ISDN is now standardised enough for large-scale implementation. One ISDN insider says that installation of large digital switches is proceeding faster than expected.

One thing holding back ISDN is the installation of fibre-optic cables all the way to the 'local loop', or individual user site.

Andy Reinhardt

Parallel Reader fastest on the market

Caere Corporation claims to have the fastest optical page-reading system on the market. The new Parallel Reader can process and recognise characters at a top speed of 700 characters per second or 2500 words per minute, the company says. The $16,495 system fast throughput is due mostly to its processing power and the way it handles pages. The box itself contains a 386SX CPU and four additional processor boards, each one holding a Motorola 68020

Our approach to PCs is a little like marriage.

Traditional Korean Wedding Ducks – "O-Ri" – are presented to Korean couples when they marry – red for the bride, blue for the groom – symbolising confidence and long life. The beautifully carved ducks sit on the mantelpiece, the direction of their heads acting as a barometer of the couple's relationship. To find out how to get an authentic pair of Korean Wedding Ducks, free, call for the address of your nearest Samtron dealer.

In Korea, when two companies decide to do business, it's just like marriage. A tradition that Samtron proudly continues in Australia.

So, besides getting a high quality PC at a very affordable price, you're also getting a commitment to a long term relationship that will grow and flourish.

A promise that's backed by a free 12 month Honeywell Nationwide Guarantee with 72 hour service turn around.

To find out more about our range of PCs, laptops, monitors and peripherals, call the number below.

We're sure you'll find Samtron a most engaging proposition.

SAMTRON

Samsung Information (Aust.) Pty. Ltd.
Sydney: 02-805 1255
Melbourne: 03-543 1722

PA7235

and 2M of RAM. Each 68020 board takes a page as it's scanned in, and reads and processes the text. Other multi-processor OCR systems assign different jobs to each processor and basically pass a page from one processor to the next, whereas Caere has all four boards working on different pages at the same time. The Parallel Reader comes with a 40M hard disk drive, a VGA display adaptor, 1M of RAM, a 5.25in floppy disk drive, MS-DOS 4.1 and Windows 2.3; no keyboard, monitor or mouse is included.

Caere's Australian distributor OmniPage can be contacted on (02) 959 3644.

Spate of new grahics products

Sun Microsystems Australia has released two new graphics software interface products — XGL and SunVision.

XGL, the first graphics software library designed for the X11 environment, increases the performance of Sun's family of 2-D and 3-D

graphics workstations. It also allows software developers to create high-speed graphics applications in Sun's OpenWindows application environment. The product is suited to applications such as animation, simulation, earth resources and mapping/GIS, and is optimised for Sun's graphics hardware.

SunVision is a software platform on which applications developers and sophisticated end users can develop visualisation applications and libraries on low-cost SPARC-based workstations. It is ideal for medical scanner companies, VARs developing software for architecture firms, automotive design engineers or visual appeal design.

Both products are expected to be available by July. Sun Microsystems Australia can be contacted on (02) 413 2666.

Atari keeps trying in DOS PC market

The ever-hopeful Atari is still trying to break away from its 'toy computer maker' image, by targeting small businesses yet again with its Atari Business Computer (ABC). The quaintly-named system is claimed to offer the power and performance of an AT-compatible for the price of an XT — just $1495 for a basic configuration.

The 8MHz ABC286 system includes 1M of memory, expandable onboard to 4M, and supports either monochrome, Hercules, CGA or EGA graphics. The system has one parallel and two serial ports, and three standard AT 16-bit expansion slots are also fitted.

A basic ABC286 configuration includes a 101-key keyboard and an internal 3.5in floppy drive, while a so-called small business starter system (including a 30M hard disk drive, colour monitor, printer and software) is expected to retail for less than $3500, according to local Atari officials.
Ian Robinson

IBM promises interoperability between SAA, AIX

Although IBM has been heavily promoting its 'seriousness' about Unix, manifested by its new RISC workstations and new version of AIX (IBM's rendition of Unix), there's a gap between IBM's Unix and its other operating systems. Those other operating systems — MVS, VM, OS/400 and OS/2 — all comply with IBM's Systems Application Architecture. SAA is a set of guidelines for consistent interface and software development characteristics, designed to let SAA-based applications communicate and share data transparently.

The environments offered for the new RISC System/6000 — AIX, OSF/Motif, AIX/Windows and NextStep — do not conform to SAA.

IBM sees SAA as its main software architecture for its business customers, and AIX as the platform for its scientific and technical customers. In other words, IBM expects that banks, insurance companies, accounting firms and financial institutions will use mainly PS/2s, AS/400s and mainframes, running OS/2, OS/400 or MVS and VM. Engineers, financial and statistical analysts, and government contractors will use mainly IBM's new workstations running AIX.

But rather than have those two classes of users isolated from each other, IBM officials say they hope to alleviate the incompatibility between AIX and SAA by providing 'interoperability' capabilities. Those capabilities will include support for sharing files and databases, common programming languages, network management, E-mail exchange, and support for the X Window System and Presentation Manager on both SAA and AIX platforms.
Nick Baran

Image compression chip cuts space and time

In a development that could make graphics less of a hog when it comes to devouring computing resources, C-Cube Microsystems has built a compression/decompression processor that can squeeze data, on the fly, by as much as 25 times. C-Cube, founded by former Weitek and Radius engineers, says that its custom VLSI processor can compress a 25M graphics image to 1M in one second, or a 1M video frame in 1/30 second, allowing for real-time compression of graphics images.

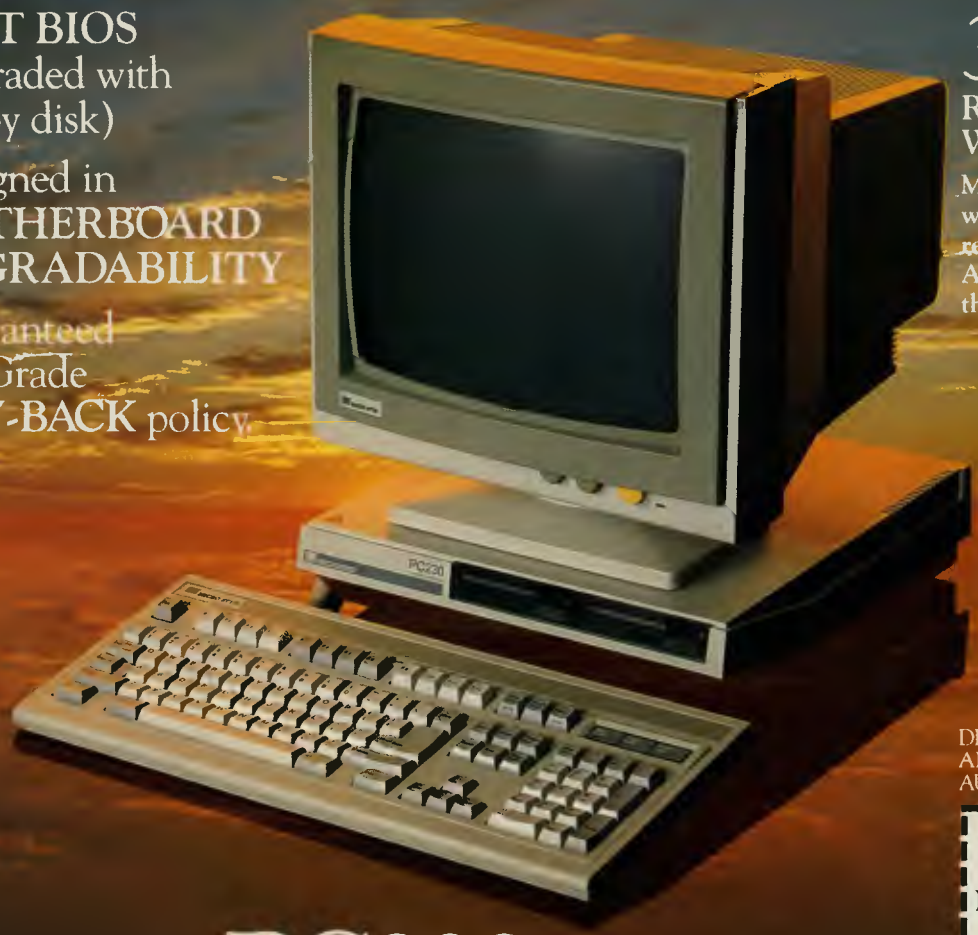
With this kind of compression power, the chip could significantly alleviate some of the processing and storage demands of such applications as multimedia, desktop video and colour desktop publishing. According to marketing manager Mauro Bonomi, there has been tremendous interest in the

AUSTRALIAN • DESIGN • REVOLUTION

OBSOLESCENCE IS OBSOLETE!

Have confidence in tomorrow. Buy Micro Byte today!

- SOFT BIOS (upgraded with floppy disk)
- Designed in MOTHERBOARD UPGRADABILITY
- Guaranteed Up-Grade BUY-BACK policy



3 YEAR REPLACEMENT WARRANTY

Micro Byte leads the way with a guaranteed 3 year replacement warranty! An unparalled offer within the industry!

AUSTRALIAN MADE AND DESIGNED

DESIGNED, MANUFACTURED AND SUPPORTED IN AUSTRALIA.

PC230

Extraordinary Speed!

Micro Byte has taken PC speed beyond the processor. Our in-house designers are able to balance the processors' speed with the I/O speed. Combining this with placing ALL the function (chips) on the mother board at 10 MHz has resulted in extraordinary screen and disc speed.

New Dealer Enquiries Welcome
Please send me more information on the PC230.

Name .....

.....

Address .....

.....

.....

Phone .....

State APC2

Talk to a dealer today

MICRO BYTE

DESIGNING COMPUTERS FOR AUSTRALIA

Micro Byte Systems Co. Pty. Ltd.
101 Mooringe Avenue
Camden Park, SA 5038
Adelaide, South Australia
Phone: (08) 376 0822
Toll Free: (008) 88 8533
Fax: (08) 294 5328

chip among manufacturers of computer equipment as well as makers of consumer electronics goods.

The single-chip CL550 uses the proposed Joint Photographic Experts Group (JPEG) standard compression algorithm, supported by IBM, DEC and NEC. The basic compression technique involves discarding data in the graphics image describing frequencies that are invisible to the human eye. Thus, with compression ratios of 10 to 1 for screen images and 25 to 1 for print images, the difference in visual quality is hardly noticeable (although quality degrades progressively as the compression ratio is increased).

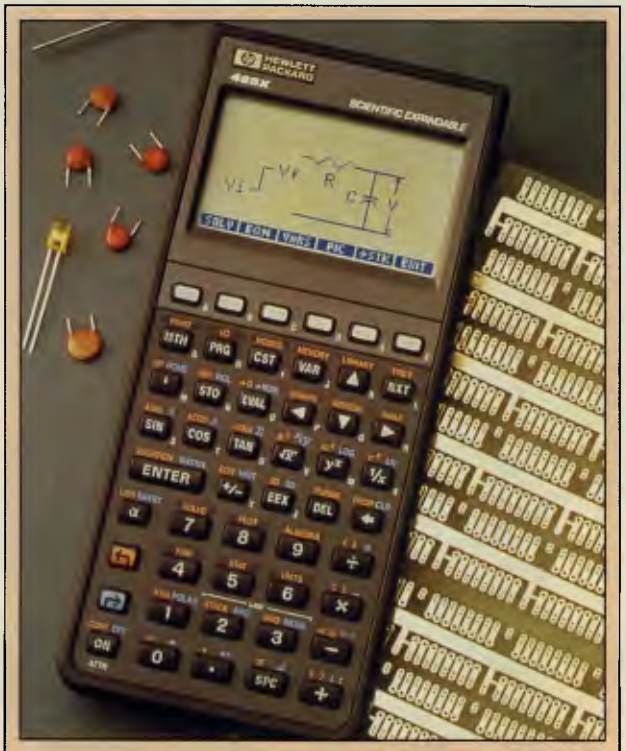
The advent of data compression processors as standard equipment in computers and devices such as digital cameras and VCRs has major implications for graphics technology. One of the big stumbling blocks to transferring and manipulating high-resolution colour images or full-motion video is the sheer size of the data files required to store those images. In 24-bit colour, an 8.5 by 11in image at 300dpi requires 25M of storage space. One second of full-motion video at 30 frames per second requires as much as 30M of storage. The ability to squeeze the graphics data by as much as a factor of 25 means faster transmission rates and much smaller memory, storage and bus bandwidth requirements.

We were not able to confirm Australian distribution arrangements at the time *APC* went to press; watch Newsprint for further details.
Nick Baran

TrueImage to materialise in Apple lasers

TrueImage, Microsoft's page-description language that will include TrueType outline fonts, will first materialise in Apple laser printers, but Microsoft officials won't say exactly when. Even though the party line is "1990," one spokesperson told us that it could be 1991 before TrueImage printers are available.

Microsoft says that the TrueImage PostScript interpreter will be available "this year." It's based on the PostScript clone that Microsoft got when it acquired Bauer last year.



HP calculator links to PCs or Macs

There was a time, long before mobile phones, car faxes and portable 486 PCs arrived, when a top-of-the-range Hewlett-Packard calculator, displayed prominently in a leather belt pouch or protruding teasingly from a shirt pocket, was the ultimate techno-yuppie accessory.

Perhaps for nostalgic reasons more than anything else, it seems that in the 1990s there is still a market for bells-and-whistles handheld calculators, and HP still leads the way. The new HP 48SX scientific calculator can not only interface to PCs or Apple Macs via a serial port, but it also features a graphical display.

The $582 technological wonder also features automatic unit management, graphic facilities that are integrated with calculus functions, an Equation Writer application and a two-way infra-red interface. The optional $102 serial interface kit includes a cable and custom software on 5.25in and 3.5in disks that link the HP 48SX to either IBM PCs and compatibles or Macintosh systems. Linked to a PC, the calculator can utilise the capacious PC disk storage and drive an attached printer.

The in-built eight-line by 22-character display also functions as a graphic screen, and can illustrate calculus functions such as intersections, roots, local extremes, derivatives, integrals and slopes. The HP 48SX can also generate standard graphics such as bar charts, histograms, scatter plots, conic sections and polar plots — watch out, Lotus 1-2-3!
Ian Robinson

Norton introduces first product for the Mac

Peter Norton Computing has introduced its Norton Utilities for the Mac, the result of a new multi-platform strategy which will broaden the company's market beyond DOS-based machines. Norton Utilities for the Unix environment will also be introduced in the near future.

The Mac version was designed specifically for the Mac from the ground up. "We didn't just port our DOS-based product into a Macintosh program. Our approach allowed us to take full advantage of the Macintosh interface and to develop a new file search algorithm that gives Norton Utilities for the Macintosh unparalleled speed," said Peter Norton.

The product is compatible with Macintosh System 4.2 and above, with a minimum system requirement of 1M of RAM. It is available from Australian distributor PC Extras and costs $175.

New entries in the language battlefield

Jensen and Partners International, best known for its TopSpeed programming tools, plans new Pascal and C++ compilers for release this quarter. TopSpeed Pascal will use the same environment as the company's Modula-2 system and will be fully ISO-compatible. It will have object-oriented extensions, including multiple inheritance.

JPI will package it with a translator facility to make the compiler compatible with Borland's Turbo Pascal, as well as library extensions to provide Microsoft compatibility. Other libraries will provide a full DOS/BIOS interface, extended graphics, support for Borland's graphic interface (BGI), and a text window manager and time-sliced scheduler. Details of the C++ compiler were sketchy, but it will be in the

SKAI DELIVERS
PRICE/PERFORMANCE PLUS

Price/Performance

Skai's PC's and Laptops deliver maximum performance at minimum cost. They're praised by reviewers and users alike. Major corporations and institutions rely on them.

Skai 286-12 Vga

Don't be scared by the low price.

80286-12 processor w **12mhz processing speed** • Zero wait state, Landmark speed **16.5MHz** • 1 Mbyte Ram configured as **640k Dos & 384k EMS memory** • **1.2Mbyte 5.25"** FDD, Multi-Function card • **16 bit VGA** graphics adapter • **14" VGA** colour monitor w T/S base • **20Mb 27ms V/C** HDD w **1.1 Interleave cntrllr** • 101 key enhanced keyboard. **$2,695**inc.

✚Security

Skai is an independent member of the Porchester Group of companies, a substantial organisation with a 35 year history of reliability and stability.

Skai 286-16 Vga

The Market Leader in price/perf.

80286-16 processor w **16mhz processing speed** • Zero wait state, Landmark speed **21.5MHz** • 1Mbyte Ram configured as **640k Dos & 384k EMS memory** • 1.2Mbyte 5.25" FDD, Multi-Function card • **16 bit VGA** graphics adapter • **14" VGA colour monitor w T/S base** • **40Mbyte 25ms V/Coil** HDD w **1.1 Interleave cntrllr** • 101 key enhanced keyboard. **$Call**

Skai Desktop 386sx

Now you <u>can</u> afford a 386.

Zero wait state w Page interleaved memory access • **Landmark speed 21.5MHz** • **80386sx** processor • 1Mbyte Ram can be configured as **EMS or Extended** • 1.2Mbyte 5.25" FDD, **1.44Mbyte 3.5"** FDD • **16 bit VGA** graphics adapter • **14"** VGA colour monitor w T/S base • **40Mbyte 25ms V/Coil** HDD w **1.1 Interleave cntrllr** • 101 key enhanced keyboard • Skai **OptoMechanical mouse** **$Call**

Skai Laptop 286-16

Take it or leave it.

80286-16 processor running at 16MHz • 1Mbyte (640k Dos, 384 Ems) upgradeable to 5Mbyte • True zero wait state operation w turbo Page mode memory access, (NEAT) • Landmark speed index rating = **21.4MHz** • Detachable LCD display with white backlight RES • 640×480 • VGA res. w 16-grey scale • 40Mbyte V/C Hdd • 1.44Mbyte 3.5" FDD • 81 keys with external connection to external keyboard or to a 10-keypad • 320mm (W) × 345 (D) × 91mm (H) • Weight without battery, approx. 11.5lbs. **$4,295**inc.

✚Support

Skai provides nationwide service and maintenance, a support hotline, and the backing of technical resources that cover you now and into the future.

Skai Executive 386-20

Power to the people.

Zero wait state w Page interleaved memory access • **Landmark speed 26.5MHz** • 80386-20 processor, **2Mbytes Ram** Floor standing **Tower Cabinet 800 × 600 16 bit VGA** graphics adapter • 14" **HiRes Multi-scan VGA Colour Monitor** • 1.2Mbyte 5.25" FDD, **1.44Mbyte 3.5" FDD** • **85Mbyte 25ms V/Coil** HDD w **1.1 Interleave cntrllr** • 101 key enhanced keyboard • Skai **OptoMechanical mouse** **$Call**

Skai 386-25 Cache

No doubt. This IS THE BEST!

80386-25 processor • 8/25 MHz **•25ns static ram memory cache** • Landmark speed rating **43MHz** • **2Mbytes Ram** • **800 × 600 16 bit VGA graphics adapter** • **14"** HiRes **Multi-scan** • **VGA colour monitor** • 1.2Mbyte 5.25" FDD • **1.44Mbyte 3.5" FDD** • **85Mbyte 25ms V/Coil** HDD w **1.1 Interleave cntrllr** • 101 key enhanced keyboard • Skai **OptoMechanical mouse.** **$6,895**inc.

✚Technology

The Skai range is selected, specified and engineered by leaders in their field. Laptop, desktop, or multi-user PC LAN, Skai systems are purpose engineered. MS-DOS, UNIX or OS/2, Skai Technology is open to the future.

=Value

Call us.

PE40 Supplier.

Ring (03) 537 2722 for the name of your nearest approved dealer. Country and interstate calls 008 334 015. Facsimile: (03) 537 2490.

SKAI COMPUTER SYSTEMS. Corporate Sales Office: Porchester House, 276-290 St. Kilda Rd., St. Kilda, Vic. 3182.

***** All systems come standard with MS-DOS 4.01 & Gwbasic.**

SKAI

Skai reserve the right to alter specifications and price without notice.

same mould as other TopSpeed compilers.

Australian pricing has not yet been set; however, the basic version of TopSpeed C, known as the Standard Edition, costs $346; the Extended Edition is priced at $584; and the high-end TopSpeed C, called the OS/2 Edition, is priced at $717.

JPI has two distributors in Australia: Microway, tel: (03) 555 4544; and Quotient Technologies, tel: (02) 665 0759.

Imagine buying an i486 for 40 cents

By the year 2000, manufacturing will have become so inexpensive that chips as complex as the i486 will cost around 40 cents (currently about $1000), and memory chips with 1M capacity will sell for a little over a dollar, predicts one industry watcher.

Andy Rappaport, president of the Technology Research Group said that if historic and current trends continue, the cost of making semiconductors will be minimal, and consumers as well as designers will benefit. Many electronic goods will become dramatically more powerful, Rappaport said, to the point that the "16M, 15 mips microwave oven" is a serious proposition.

Owen Linderholm

Claris provides access to corporate databases

Claris has acquired from Red Brick Systems a query technology that's supposed to make it easier for Macintosh users to access data from large corporate databases. The Executive Query Tool lets Mac users log onto relational databases using the standard Mac interface and download data without having to learn the SQL programming language. When a user on a client-server network makes a query, EQT generates the SQL code, which then queries the database.

Claris plans to develop a new application based on EQT by the end of this year. EQT runs on top of standard server-access protocols like Apple's CL/1, OCI from Oracle and DB-Lib from Sybase, which will allow for access to most corporate databases, Claris claims.

Patchwork utility imports data to 1-2-3

Who said there were no software developers left in Australia? Attacking a much-neglected market niche, Sydney-based software developer Seamless Software has released a utility that extracts data from externally-generated reports and loads it directly into Lotus 1-2-3 worksheets.

Patchwork is a utility that makes use of Lotus-style menus and context-sensitive help, so that its operation can be quickly picked up by 1-2-3 users, according to Seamless Software officials. The program also features a 'learn mode', which allows users to automatically convert a sequence of commands into a reusable macro.

The $490 Patchwork, which includes a comprehensive manual and two tutorials with sample data, automatically takes account of column headings and data formats. The report being imported can be displayed as a window on the screen or in full-screen format.

Seamless Software can be contacted in Sydney on (02) 954 9073.

Ian Robinson

Improved service for Telecom's remote subscribers

Telecom Australia has decided to install a newly-developed Philips high-capacity radio concentrator system in attempts to improve services to isolated telephone subscribers in south-eastern Victoria.

The Gippsland pilot installation of the Philips IRT 2000 — costing around $200,000 — will provide subscribers with easier and better quality voice links into the Telecom network system.

Mr Saines, general manager of Philips TDS said that the IRT 2000 system has proved to be an attractive alternative solution to small telephone exchanges and remote multiplexers in country areas all over the world. "The system, only released two years ago, has already been ordered by more than 20 countries."

The same system was used in Auckland this year to provide voice and data links for the XIV Commonwealth Games. TV coverage of logistically difficult events, such as marathons, road walks and road cycling, was made possible by the Philips system.

Philips TDS can be contacted on (03) 881 3586.

New Star printer locks out grey marketers

Star Micronics has left potential grey marketers of its printer range out in the cold with the release of its 9-pin dot matrix printer, the $900 LC-15. The model features four near letter-quality (NLQ) fonts and prints at four speeds ranging from the high-speed 180cps draft mode to 37.5cps NLQ mode.

The LC models — including the 10II and 24-10 released last month — have almost eliminated Star's grey market problem which plagued its NX range of printers. Parallel importers were selling 220v Star NX-1000 printers sourced from Hong Kong against the authorised 240v model distributed by Star Micronics.

Consumers can now easily distinguish between the 220v and 240v printers. The 240v equipment bears the designation LC, whereas all 220v models retain the NX designation. These NX printers, while meeting Star's standards for 220v equipment, are unsuitable for Australian conditions and are not covered by the company's 12-month warranty in Australia or New Zealand.

"Star has shown the industry how serious we are about grey marketing of our products, and we are continuing our push into the corporate market with the LC printer range . . ." said Star's general manager Bruce Elliot.

3Com ships new communications servers

3Com Corporation has announced two new communications servers, the CS/2000 and CS/2100, that support industry-standard networking protocols.

Ideal for local departmental installations, the products are high-performance communications servers that connect groups of up to 10 terminals, PCs, modems or printers to a LAN.

SOUND BLASTER

BLAST

AWAY THE PC SOUND BARRIER !!!

INTRODUCING THE P.C. SOUND CARD THAT IS REALLY SIX CARDS BUILT INTO ONE

1 12-Voice stereo C/MS music. (C/MS and Game Blaster compatible). This means that your SOUND BLASTER can run the complete Creative Music System's Software Library and work with numerous game programs.

2 11-Voice FM music (fully AdLib* compatible). FM sound generation produces additional sounds comparable to expensive synthesizers in the market. Since it is also AdLib* compatible, your SOUND BLASTER will have the largest collection of supporting software from DAY 1.

3 1 digitized voice channel (DAC) Real world sound samples — speech, animal calls, special effects, machine noise, thunderstorm, etc... can now be easily reproduced for presentations, education, games, etc...

4 Voice input (Digital Sampling) capability. Sampling can be done by plugging in a standard microphone into the built-in microphone jack and amplifier. The SOUND BLASTER proprietory voice compression software and decompression hardware reduces massive storage volume into manageable files.

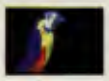
5 Built-in Game I/O port. For standard PC analog joysticks.

6 Built-in MIDI interface. All you need is a MIDI connector box/cables (optionally available) in order to connect your SOUND BLASTER to MIDI instruments or keyboards.

7 Built-in power amplifier. (4 watts per channel) Allows you to directly connect any kind of speakers or headsets. Cables are provided for connection to your home stereo. Includes volume control.

8 Bundled software 1: C/MS Intelligent Organ. This powerful, easy to use organ software lets you play and learn to play orchestra-like music using only ONE finger on your PC keyboard. Background accompaniments and rhythms are added automatically. No music knowledge required. And now you can play it from your MIDI keyboard too.

9 Bundled software 2: Talking Parrot. This mischievous parrot mimics your speech, talks back, passes outrageous remarks and even screams when you tickle it.



10 Bundled software 3: The VoxKit. Voice development toolkit to record, compress, store and play-back the digitized sounds.

SOFTWARE *supported by the largest software library*

The following software are registered trademarks of the companies listed in bold before them. Referenced companies are registered trademarks of their intended companies*

Accolade
Conspiracy
Capcom
Pocket Rockets
Cosmi
Chomp
Navy Seals
Data East USA Inc
Monday Night Football
Electronic Arts
Cartooners
Lakers vs. Celtics
Budokan
Keef the Thief
Kings of the Beach
688 Attack Sub
Epyx
Omnicron Conspiracy
Gamestar (Mediagenic)
Ghost Busters II
Take Down
Manhole
Kyodai
Hydlide
Murder Club
Psychic Wars
Lucasfilm Ltd
Indiana Jones - Last Crusade
Battle Hawk
Indy: The Graphic Adventure
Loom
Mastertronics/Virgin
Ray Trace vs. Mega Death Aliens
Excaliber
Robin Hood
Michtron
Air Ball
Microillusion
Flintstones
Jonny Quest
Questmaster I: The Prism of Heuhotol
Scooby Doo
MicroProse
Red Storm Rising
The Sword of the Samurai
F15 Strik Eagle 2
F19 Stealth Fighter V3.0
M1 Tank Platoon
Omnitrend
Breach 2
Universe III
Origin
Times of Lore
Paragon Software
Spiderman and Captain America in Doctor Dooms Revenge
Traveller
X-Men
Sierra
Code Name Iceman
The Colonel's Bequest
The Conquest of Camelot
Hero's Quest
Hoyle's Book of Games
King's Quest IV
Leisure Suit Larry 2
Leisure Suit Larry 3
Police Quest II
Silpheed
Sorcerian
Space Quest III

and many more to come...

Software Toolworks
Beyond the Black Hole
Taito
Alcon
Bubble Bobble
Revenge of Doh
Operation Wolf
Qix
Rastan
Renegrade
Sky Shark
Velocity Corp.
JetFighter
C/MS Software
Intelligent Organ
Pop-up Music
C/MS Presenter
C/MS Composer
C/MS Music Teacher
Sing Along II
100 of Songs

$399

Computamart
Leaders in PC entertainment
622 Newcastle Street, Leederville W.A 6007
Telephone (09) 328 9799 Fax (09) 227 7324

Computamart
Leaders in PC entertainment

622 Newcastle Street, Leederville W.A 6007
Telephone (09) 328 9799 Fax (09) 227 7324

DEALER ENQUIRIES WELCOME

*AdLib is a registered trademark of AdLib Inc

The $5020 CS/2000 is a diskless unit and is booted over the network with 3Com's Network Control Server (NCS) station. The CS/2100 costs $4940 and incorporates a 3.5in disk drive and can be booted locally through this unit, or centrally through the NCS.

Both products are part of 3Com's communications server family, which also includes the CS/1 server.

Sharp's new Electronic Organiser

Sharp Corporation has added another model to its family of Electronic Organisers. The IQ-7200 has 64K or RAM (double that of its earlier model, the IQ-7000) which can be increased by 32 or 64K with blank integrated circuit (IC) cards. The IQ-7200 comprises a diary, notebook, calculator, planner, world clock, 200- year calendar and telephone directory. It will sell for $449.

Sharp has also upped the ante in the notebook PC market with the debut of its 2kg model with VGA graphics. The 286-based PC-6220 is the first laptop to sport a VGA-compatible display in the lightweight notebook form factor, said Marian Taylor, business computer product manager for Sharp Australia.

The PC-6220 is powered by a 12MHz 286 processor and comes with 1M of RAM (expandable to 3M) and a 20M hard disk drive. The display incorporates a new triple-supertwist technology, which enhances contrast on a screen just 1cm thick, according to officials.

The laptop will be available in Australia by June for less than $6000.

IBM expands financial support of OSF

IBM has announced that it has expanded its financial support to the Open Software Foundation (OSF). In addition, IBM has said it intends to ship future AIX offerings based on the OSF/1 operating system.

"IBM became a founding sponsor of the Open Software Foundation because we share its commitment to provide the best technology our industry can offer through an open, vendor neutral selection process," said Jack Kuehler, a president of IBM.

IBM has licensed the early release of OSF/1 and initial porting efforts are underway. The company intends to provide its first implementation of the OSF/1 operation system on its PS/2 platform in 1991. "OSF/1 will be the open operating system for the 90s, and OSF will continue to drive technology forward while protecting the interests of end users and the industry," concluded Mr Kuehler.

NeXT considers Australian distribution

Despite numerous rumours over the past 12 months, microcomputer pioneer and Apple co-founder Steve Jobs appears to be in no hurry to flood the Australian market with his NeXT workstations. Nevertheless, technophiles will be technophiles, and NeXT systems are still finding their way into the country.

NeXT officials have denied that Canon Australia is a likely channel, as a previous agreement (linked with Canon's recent acquisition of some NeXT stock) makes Canon responsible for distribution in Japan and South-East Asia only.

One industry source claimed that major PC dealership group HiSoft has recently "struck up some sort of deal to sell NeXT systems here." When HiSoft's financial director Colin Bannard was asked if HiSoft had made an agreement with NeXT, he noted that the matter "hasn't been resolved yet."

A NeXT official claimed that the firm has made no announcements concerning distribution arrangements in Australia, saying that "it has been put on hold for the moment. NeXT can't do everything at once, so it is concentrating on one part of the world at a time."

It's nice to know where we stand in terms of global priorities.

Ian Robinson

Australia's first piracy case

In an historic decision for the computer software industry in its efforts to combat illegal copying and piracy in Australia, the Federal Court has awarded substantial damages to Autodesk Australia against an individual who had been involved in large-scale piracy.

Charles Cheung was ordered to pay $50,000 in damages plus all legal costs to Autodesk Australia and its parent company for infringing copyright in the leading PC-based CAD software product, AutoCAD. Mr Cheung had been distributing pirated copies of AutoCAD that were imported and offered free of charge as an incentive to purchasers of computer hardware. Evidence presented to the Court on behalf of Autodesk indicated that, on two occasions, Mr Cheung admitted that he knew the software offered by him was pirated and its supply was illegal.

Mr Julian Stephens of Messrs Stephens Solicitors, Counsel for Autodesk Australia said, "This decision is pleasing because it clearly demonstrates the seriousness with which the software piracy issue is being treated by the Federal Court of Australia. Hopefully this judgement will act as a deterrent to other people involved in software piracy who are under the mistaken belief that the Australian legal system will treat them lightly."

Mr Stephens added that damages awards and fines are likely to be even greater if the offender is a company or similar organisation, as opposed to an individual.

Acer lands in Australia

As part of an ongoing strategy to establish itself as a global company, Acer Incorporated, which is currently represented in more than 70 countries, has opened its doors for business in Australia.

The company may be new to local shores, but its products are not. Acer computers first entered the Australian market several years ago using the brand name Multitech, and in 1988 switched to the name Acer.

Now There is Only One Set of Tools You Need for Your PC

PC TOOLS DELUXE VERSION 6

PC TOOLS DELUXE VERSION 6 WILL...

UNDELETE. EXE	- *Undelete deleted Files*
UNFORMAT. COM	- *Unformat Formatted Disks*
DISKFIX. EXE	- *Fix all sorts of disk problems*
PC BACKUP. EXE	- *Backup your hard disk*
PC FORMAT. COM	- *Format disks*
PCSHELL. EXE	- *Dos shell for Copy/Move etc.*
PCSHELL. HLP	- *Online help throughout PC Tools*
VIEWERS. EXE	- *View over 30 file formats*
ITLFAX. COM	- *Send/Receive Faxes*
DESKTOP. EXE	- *Database/Word processing/Notepad*
PARK. COM	- *Park your hard disk*
PC-CACHE. COM	- *Speed up access. New Write Cache!*
BACKTALK. EXE	- *Modem works in Background*
PC SECURE. EXE	- *Secure your data !*
COMPRESS. EXE	- *Compress your hard disk or files*
LLQC. EXE	- *Transfer Files to other computer*

RUN ON A NETWORK & BE MEMORY RESIDENT

LISTED ARE ONLY A FEW OF THE CAPABILITIES OF PC TOOLS DELUXE VERSION 6

Copy **M**ove Delete **R**ename **V**iew Hex**E**dit **F**ind **P**rint **L**ocate File**E**dit **U**ndelete
F1 Help **F2** QView **F3** Exit **F4** Unselect **F5** Copy **F6** Display **F7** Locate **Change User Level**

PC EXTRAS

86 George Street, Redfern, NSW 2016
Ph: (02) 319 2155. Fax: (02) 698 9926.
Melbourne: (03) 486 1999. Brisbane: (07) 818 1400.

Please Send me Information on: ☐ PC Tools Version 6

9683

Name:_____ Address:_____

Company:_____ Phone:_____ Fax:_____

My Preferred Sofware Supplier:_____

Leonard Communications 9683

The new dealer team will include the established links with Dick Smith, Remington and Datamatic.

"Acer's presence in Australia will facilitate a higher level of support for Acer products. Distributors . . . can now receive direct marketing support, training, more product information and greater product availability," said Acer Computer Australia managing director Roger Hausler.

Hewlett-Packard expands colour printer range

Hewlett-Packard has introduced the HP PaintWriter XL, its third colour printer for Macintosh users. The printer is designed to be shared by Macintosh users whose computers are on an AppleTalk network. It prints a page of colour graphics in 1.5 minutes and has a dual AppleTalk/RS-422A interface.

The inkjet printer has automatic sheet feeding of transparency film and paper for high-volume printing and networking needs, handling letter (A/A4) and tabloid (A3/B) media sizes. The colour-graphics printer has a simple front panel and platinum case typical of Macintosh printers.

Hewlett-Packard can be contacted on (03) 895 2895.

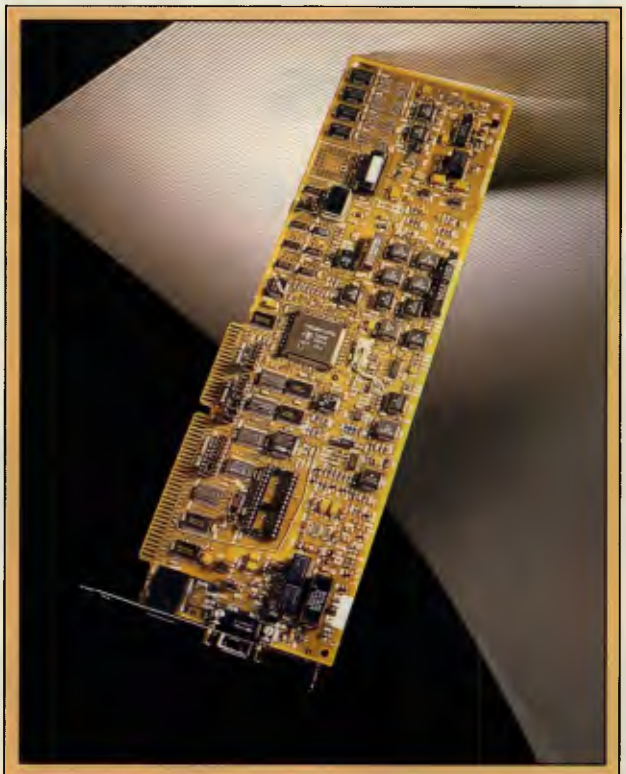
Macro command language for DesignStudio document creation

Letraset Australia has introduced DesignScript, the first command language interface to a desktop page layout package. DesignScript enables an end-user or program developer to automate the process of creating catalogues, price lists, directories and other material that change content within a relatively fixed format. It works by automating most of the features of DesignStudio, Letraset's high-end layout program.

The process of importing and formatting text data from a database is just one example of the potential applications of the product. When processed by DesignScript, these files become DesignStudio documents, ready to be printed as camera-ready copy.

The user first creates a command script, a series of command language statements — set up a page, create text blocks, place text into these blocks, create tags and draw graphic objects. These files can be created in DesignStudio itself, or in any Macintosh program that can produce standard ASCII files. DesignScript's command language processor then reads the script, opens a new window, and creates a new document according to the commands.

DesignStudio is priced at approximately $200 and is available from Letraset Australia, tel: (02) 975 1033.



Proteon reveals EISA Token Ring adaptors

The arrival of ultra-fast 16Mbps Token Ring networks has caused almost as much excitement as EISA and bus master technology — and if you can integrate all three of these into one product range, you're really on a winner, according to connectivity specialist Proteon.

A new range of Proteon boards, available locally through Com Tech and in an OEM format from Compaq, have all of the latest features in one package. Known as the Proteon 4/16 family, the range includes the first Token Ring card for the 32-bit EISA bus.

All cards in the range have the facility to connect to unshielded twisted pair cabling through an external media filter. This plugs into the shielded twisted pair port and operates like a transceiver to support the cheaper unshielded cable.

The Proteon boards, together with the new TokenVIEW Plus network management software and the Series 70 Intelligent Wire Centre, offer a complete unshielded twisted pair 4/16Mbps solution, according to Com Tech officials.

One of the distinguishing features of the P1390 ProNET AT Network Interface Card is that it is a 'bus master' board. It also has a self-selecting 8/16-bit I/O interface that automatically adjusts to suit either the 8-bit PC bus or 16-bit AT bus. The P1390 board supports Novell NetWare, Banyan VINES, Microsoft OS/2 LAN Manager and IBM networking software.

Ian Robinson

Network servers boosted by Compaq

Compaq has introduced a powerful server-based network interface controller for Token Ring networks that takes advantage of the increased performance of the EISA bus when used in conjunction with the Compaq Systempro or Deskpro 486/25.

The 32-bit DualSpeed Token Ring Controller, which is priced at $1995, allows communications data to be transferred more than 30 per cent faster than competitive offerings, claims Compaq. While boosting network performance, the Controller adheres to recognised Token Ring industry standards and is fully compatible with customers' existing Token Ring environments. It features optimised drivers for superior performance across popular operating systems, including Novell NetWare 386, Novell NetWare 2.1x and LAN Manager.

Prime powers up low-end Unix family

Prime Australia has boosted the power of its entry-level Unix system with the release of the EXL MBXPlus.

The system incorporates a 25MHz 386 microprocessor and typically supports up to 32 users.

Options for the EXL MBXPlus include 94 and

TIME MACHINE

The Livermore Loops Test showed the 2C87 performed at nearly twice the rate of the 80287. On the LINPACK benchmark the 2C87 performed about 1.7 times faster than the 80287. This agreed closely with our low-level FPU benchmark which showed the 2C87 to be, on average, 1.8 times faster than the 80287. A polygon rotation through 360 degrees . . . on the 80287 finished in 345 seconds, while the 2C87 was done in only 179 seconds. **Rick Grehan in *Byte*, September, 1989.**

IIT — The New Standard in Coprocessors

The IIT range of coprocessors delivers performance superior to Intel's 80287 & 80387 co-processors and they are available NOW!

Guaranteed up to 200% faster than Intel, on Intel's own benchmarks, IIT co-processors are guaranteed 100% Socket and Software compatible or your money back.

You get much, much more than with an Intel co-pro.

- Up to 200% faster than an Intel, at the same clock speed in the same socket!
- Available in a 20MHz version (2C87-20), compatible with 20MHz 80286 machines. Perfect for 16 & 20MHz 80286 machines. There is no Intel equivalent.
- Guaranteed Accuracy. Warranted to be in compliance with IEEE 754-1985 standard.
- A complete range, including three 2C87 (80287 compatible), a 3C87SX (16 & 20MHz 80387SX compatible, available June 1990) and 3C87 (80387 compatible) units up to 33MHz.
- Low power consumption. CMOS design makes our chips ideal for laptops. Power consumption is ¼ that of old fashioned coprocessors. A unique sleep mode cuts power consumption further, lengthening battery life.

The IIT Coprocessor Range — we've got you covered

80286 Computers	2C87-8 (8MHz)	(replaces 80287-8)
	2C87-10 (10MHz)	(replaces 80287-10)
	2C87-12 (12MHz)	(replaces 80287-12)
	2C87-20 (20MHz)	(not avail. from Intel)
80386SX Computers	3C87SX-16 (16MHz)*	(replaces 8037SX-16)
	3C87SX-20 (20MHz)*	(replaces 8037SX-20)
80386 Computers	3C87-20 (20MHz)	(replaces 80387-20)
	3C87-25 (25MHz)	(replaces 80387-25)
*Available June 1990	3C87-33 (33MHz)	(replaces 80387-33)

- The 2C87 (80287 compatible) includes all the instructions added by the 80387, as well as a new instruction that vastly speed up 3-D graphics.
  The 4-by-4 element matrix transformation speeds up 3-D operations up to eight times faster than an 80287 and three times faster than an 80387 — with the ability to run on 80287 machines at a true 20MHz as a bonus. A unique floating point architecture gets the job done faster, by using far fewer clock cycles.
- An IIT Coprocessor is an investment in the future. Major CAD & other software companies are committed to writing their software to use the IIT's unique functions. Don't get caught with an obsolete coprocessor.
- 5 year warranty — we really stand behind our products.

Authorised Australian Distributor:

CAD Connection: Level 3, 220 Pacific Highway, Crows Nest 2065, Phone **(02) 957 6719.** Fax **(02) 957 4011.** Dealer Enquiries Welcome.

CAD CONNECTION
Improving your productivity

CIRCLE 44 ON READER INFO CARD

MICROLAND
AUSTRALIA'S No. 1

ALL PRICES INCLUDE SALES TAX.
ALL PRODUCTS SOURCED FROM THE OFFICIAL AUSTRALIAN DISTRIBUTOR.
PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

SYDNEY Tel: (02) 550 5333
Fax: (02) 550 5252
90-94 Parramatta, Stanmore, 2048.

MELBOURNE Tel: (03) 419 7788
Fax: (03) 419 1414
250 Gore St, Fitzroy, 3065.

WORDPERFECT V5.1 $529

HYPERACE 286 PLUS $445

XTREE PRO $120

FASTBACK PLUS V2.0 $185

PHILIPS 14" EGA MONITOR $645

COLORADO 60 MB TAPE BACKUP $640

SOFTWARE

WORDPROCESSOR

AMI	$295.00
AMI Professional	$645.00
Lotus Manuscript	Call
MS Word for Windows	$510.00
MS Word V5.0	$445.00
Multimate V4.0	$645.00
PFS Prof. Write	$219.00
Wordperfect V5.1	$529.00
Wordstar 2000+ V3.0	$385.00
Wordstar Prof. V6.0	$385.00

SPREADSHEET

Lotus 123 V2.2	Call
Lotus 123 V3.0	Call
MS Excel	$545.00
MS Multiplan	$235.00
Quatro	$210.00
Quatro PRO	$590.00

ACCOUNTING

Attache 5	Call
Attache Modules	Call
DAC Easy VER 3.5	$275.00

CAD

Design CAD 2D	$395.00
Design CAD 3D	$449.00
Generic CAD	$549.00

COMMUNICATIONS

Carbon Copy Plus	$235.00
Crosstalk MK 4.0	$305.00
Crosstalk XVI	$184.00

COMMUNICATIONS

Desklink	$195.00
Gateway V3.0	$140.00
Mirror VER 3.0	$155.00
PC Anywhere	$135.00
Procomm Plus	$110.00
Smarterm Series	Call
Softerm PC	$435.00
Supercom V3.0	$155.00

DATABASE

Clipper	$720.00
DBase III Plus	$899.00
DBase IV	Call
DBXL V1.3	$295.00
Paradox V3.0	$750.00
Q&A V3.0	$435.00
Quicksilver	$695.00
RBase for DOS	$775.00

DESKTOP PUBLISHING

Corel Draw VER 1.11	$795.00
GEM Desktop Publisher	$310.00
Pagemaker V3.0	$1,295.00
PFS First Publisher	$159.00
Ventura V2.0	$1,080.00
Ventura with Prof. Ext.	$1,295.00

GRAPHICS

Autosketch VER 2.0	$229.00
GEM Artline	$550.00
GEM Draw Plus	$325.00
GEM Graph	$325.00

GRAPHICS

Harvard Graphics	$470.00
Lotus Freelance Plus	Call
Lotus Graphwriter II	Call
PFS First Graphics	$175.00

INTEGRATED

Framework III	$790.00
GEM Presentation Team	$550.00
Lotus Symphony V2.0	Call
MS Works	$195.00
PFS First Choice V3.0	$185.00

LANGUAGE

MS C Compiler	$565.00
MS Cobol Compiler	Call
MS Fortran Compiler	Call
MS Macro Assembler	$199.00
MS Pascal Compiler	Call
MS Quick C	$129.00
MS Quickbasic	$129.00
Nortons Editor	$89.00
Smalltalk V	$235.00
Turbo C V2.0	$165.00
Turbo Pascal V5.5	$165.00

PROJECT MANAGEMENT

Flowcharting II Plus	$345.00
Harvard Project MGR III	$755.00
MS Project	$490.00
Superproject Plus V3.0	$580.00
Timeline V4.0	$810.00

TRAINING

Type Quick	$80.00

UTILITY

Allways	$179.00
Copy II PC	$55.00
Desqview 386	$229.00
Desqview V2.2	$169.00
Disk Technician Plus	$189.00
Fastback Plus V2.0	$185.00
Fastlynx	$220.00
Formtool	$175.00
Laplink III	$174.00
Lotus Agenda	Call
Lotus Magellan	Call
Mace Gold	$210.00
Mace Utilities	$140.00
MS Mouse	$205.00
MS Windows 286	$135.00
Norton Advanced	$145.00
Norton Commander VER 3.0	$179.00
Norton Utilities	$108.00
PC Alien	$79.00
PC Tools Deluxe VER 6.0	$220.00
Security Guardian	$265.00
Sidekick Plus	$159.00
Sideways	$89.00
Norton Backup	$195.00
Spinrite II	$135.00
Take Charge	$165.00
View Link	$175.00
XTree PRO	$120.00
XTree PRO Gold	$150.00

HARDWARE

9 PIN PRINTERS

OKI ML 172	$320.00
OKI ML 182	$365.00
OKI ML 182 Turbo	$410.00
OKI ML 320	$675.00
OKI ML 321	$845.00
Epson LX 400	$375.00
Epson LX 850	$410.00
Epson FX 1050	$925.00
Epson DFX 5000	$3,390.00
Fujitsu DX 2300	$550.00
Fujitsu DX 2400	$765.00
Brother M 1209	$410.00
Brother M 1709	$410.00

24 PIN PRINTERS

OKI ML 380	$675.00
OKI ML 390	$845.00
OKI ML 391 Turbo	$1,175.00
OKI ML 393	$1,975.00
Epson LQ 1050	$1,149.00
Epson SQ 2550	$2,375.00
Fujitsu DL 1100	$725.00
Fujitsu DL 3400	$1,185.00
Brother M 1224	$660.00

24 PIN PRINTERS

Brother M 1824	$870.00
Toshiba EW 311	$599.00

LASER PRINTERS

Toshiba Pagelaser 6	$2,365.00
Brother HL8E	$3,635.00
OKI Laser 400	$2,350.00
H.P. Laserjet IIP	$2,895.00
Epson GQ 5000	$2,950.00
Canon LBP8-IV	$2,795.00
Fujitsu RX 7100	$2,950.00

HARD DISKS

Seagate 20 MB + CONT.	$469.00
Seagate 30 MB + CONT.	$490.00
Kalock 20 MB 40 MS	$385.00
Kalock 30 MB 40 MS RLL	$440.00
Miniscribe 40 MB + CONT.	$640.00
Miniscribe 40 MB AT SCSI CONT.	$675.00
Conner 40 MB AT SCSI CONT.	$775.00
Conner 104 MB AT SCSI CONT.	$1,395.00
Control Data 40 MB V/Coil	$760.00

HARD DISKS

Plus Impulse 40 MB 18 MS	$990.00
Plus Impulse 80 MB 18 MS	$1,495.00

TAPE BACKUPS

Colorado 60 MB Internal	$645.00
Colorado 60 MB External	$880.00
Archive 40 MB Internal	$695.00
Archive 80 MB AT Internal	$890.00
Archive 150 MB Viper QIC02	$1,245

PC ENHANCEMENTS

Hyper 128K AT	$295.00
Hyper 256K XT	$275.00
Hyperace 286 Plus	$445.00
Hyperam AT 512K	$475.00
Hyperam XT 512K	$435.00
Intel Above BD Plus 512K	$930.00
Intel Above BD Plus 8 2MB	$1,495.00

VIDEO BOARDS

Ega Cards	$195.00
VGA Cards 8/16 BIT	$295.00
VGA Cards 16 BIT PARADISE	$340.00
Vega VGA	$390.00
Video 7 1024i	$555.00

VIDEO BOARDS

Video 7 V/RAM	$1,050.00
Paradise VGA Plus	$495.00

MONITORS

Samsung 12" Monochrome	$165.00
ADI DM 14 14" Monochrome	$210.00
Philips 14" EGA	$645.00
Philips 14" VGA	$675.00
NEC Multisync 2A	$735.00
NEC Multisync 3D	$975.00
EI20 8060S Flexscan	$1,195.00
EI20 CAD Monitors	Call

NETCOMM MODEMS

2400 In Modem	$465.00
1234 In Modem	$525.00
Auto Modem 24/24	$475.00
Auto Modem 1234	$575.00
Smart 2400 SA	$665.00
Smart 1234 SA	$745.00
Smart M4	$850.00
Datalock 123 SA	$895.00
Datalock 1234 SA	$990.00
Pocket/Rocket 1234	$540.00
Netcomm Fax Card	$590.00

LIMITED OFFER

ENQUIRE ABOUT OUR

FREE DBASE IV

OFFER WITH EVERY PERSONAL COMPUTER OR LAPTOP

MICROLAND

AUSTRALIA'S No. 1

LEADING THE WAY INTO THE 1990s

NO. 1 FOR THE LATEST PRODUCTS
NO. 1 FOR AFTER SALES SUPPORT
NO. 1 FOR TECHNICAL SERVICES
NO. 1 FOR CONSULTATION SERVICES
P.E. 40 SUPPLIER TO GOVERNMENT

AUSTRALIAN COMPUTER DEALERS ASSOCIATION
MEMBER

olivetti

PCS 286

12 MHz IMB RAM, 40 MB 29MS HDU
1.44 MB FDD, 101 KEYBOARD,
14" VGA COLOUR MONITOR

AND

BUNDLED SOFTWARE FOR LESS THAN **$3,495** Inc. Tax

FREE Software and training packs worth $1,304

- SPEED, QUALITY, VALUE FOR MONEY
- ASHTON TATE'S FRAMEWORK III
- GREG SCHMIDT TRAINING TAPES
- OLIVETTI SECURITY

Wearnes

BOLDLINE M SERIES

12.5 MHz IMB RAM, 40 MB HDU
1.44 MB FDD, 101 KEYBOARD,
14" VGA COLOUR MONITOR

$2,988 Inc. Tax

BOLDLINE 286

THE COMPUTER WITH THE FUTURE BUILT-IN

- DEDICATED SLOT FOR 386SX or i486 UPGRADE
- EMS 4.0 SUPPORT
- 80287 AND 80387SX SOCKET (ON 386 SX MODULE)
- IMBEDDED HDU CONTROLLER WITH 1:: INTERLEAVE

ULTRA XT

20 MB MONO SYSTEMS

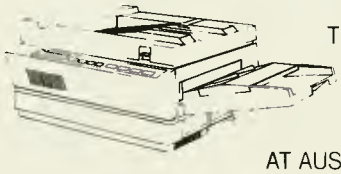
$1,495

INCLUDES FREE DBASE IV

CALL FOR ULTRA PLUS RANGE!

TOSHIBA

WE WILL NOT BE BEATEN ON TOSHIBA PRICES OR AFTER SALES SERVICE! FULL RANGE OF PRODUCTS AND SERVICES



THE FABULOUS PAGE LASER 6.
THE BEST VALUE LASER PRINTER
AT AUSTRALIA'S BEST PRICE!

DON'T MISS OUT. ACT NOW!

$1995 LIMITED TO CURRENT STOCK

AST

THE NATURAL PROGRESSION

BRAVO 286
MODEL 45

AT SYSTEMS AS LOW AS $1,995 Inc. Tax

- INCLUDES 44 MB V/COIL HARD DISK 28 MS
- MONO MONITOR
- FREE FULLY INTEGRATED ACCOUNTING SOFTWARE

PLEASE CALL FOR OTHER AST MODELS

PC WORLD CLASS AWARDS

BEST PRINTER – LQ 1050
ONLY $1,149 Inc. Tax
WHILE STOCKS LAST!

EPSON

EPSON PCe 20 MB MONO SYSTEM $2,149 Inc. Tax

EPSON PCAX2e 40 MB EGA SYSTEM $3,990 Inc. Tax

CALL FOR OTHER EPSON CONFIGURATION/PRINTERS

AST debuts Australia's first 33MHz 486 system

AST Research last month won the race to be the first PC manufacturer to debut in Australia a PC based on the 33MHz version of Intel's 486 processor, narrowly beating rival Advanced Logic Research (ALR) to the punch.

Proving that AST, like many of its peers, is not averse to cute acronyms, the new AST Premium 486/33 features AST's CUPID-32 (Completely Universal Processor, I/O Design) bus architecture. Utilising this backplane design, the system can be upgraded with add-in processor boards as even faster chips become available, officials said. In other words, power users hanging out for the forthcoming 40MHz 486 need not worry.

While ALR remains the only other major player so far to launch a 33MHz 486 machine, AST has focused its competitive strategy on Compaq's range. The AST Premium 486/33 operates 30 per cent faster than Compaq's Deskpro 486/25 computer for about the same price, claimed AST officials.

All three models of the AST Premium 486/33 are decked out with 4M of memory, six AT-compatible expansion slots, one parallel port, two serial ports and a 5.25in floppy disk drive.

Ian Robinson

323M disk drives, a 60M cartridge tape drive, a helical-scan tape device, an 80386 numeric coprocessor and an Ethernet local area network controller.

"The new Prime EXL MBXPlus offers significantly faster processing and increased user capacity, plus the versatility of sharing thousands of standard Unix, Pick and DOS-based application programs with the full line of Prime EXL systems," said Prime Australia's marketing director David Sanday.

A basic configuration with a 25M 386 processing unit, 4M of RAM, a 1.2M floppy and 94M hard disk drive is priced at $20,000. The company can be contacted on (02) 968 9200.

Canon copier digitises slide images

Canon has announced the availability of an optional high-resolution 35mm digital film scanner for its CLC 500 plain paper colour laser copier. Unlike other colour systems which project light into the optics of the copier, the latest system uses a high-resolution charged coupled device (CCD) to convert the images into electrical signals, which are then fed into the copier.

The resultant colour copy carries more information than does a standard photographic print and is produced much faster — A3 enlargements can be produced automatically on the spot in a few seconds.

Olivetti and Wyse targeting large-volume 286 market

Triumph-Adler/Olivetti and Wyse are set to woo the large-volume 286 market with the release of the M300 and WY-2012i, respectively.

The Olivetti offering runs at 16MHz with zero wait states, and uses 32-bit processing for high-performance, and a 16-bit bus for compact physical size. Storage options include a 40 or 100M hard disk and 1.44 3.5in or 1.2M 5.25in floppy disk drive. Memory expansion boards can be slotted in to increase the memory capacity (up to 4M on the CPU).

The Wyse can also be expanded to 4M of onboard memory, and offers four mass storage shelves and eight expansion slots. It comes in either a single floppy version or a 40M hard disk drive version.

Amstrad's laptops

Amstrad has released two powerful laptop computers, the Alt-286 and the Alt-386SX, which will be competing against Toshiba, according to Amstrad's chairman Alan Sugar. Mr Sugar said the portables are the first in a line of new, higher-end products designed to

push Amstrad further into the high-end of the business market.

The machines feature a 3.5in internal floppy, 20 or 40M hard disk drives, backlit VGA (640 by 480 pixels), LCD screens and rechargeable Ni-Cad batteries.

The Alt-286 will cost around $4000, while the Alt-386SX will cost $5499.

EN

"Do you want me to call the company and have it send another review copy of their third-party software, or do you know what you're going to write?"

COMMUNICATION BREAKTHROUGH IN LAPTOP TECHNOLOGY BY ECI!

Remote Terminal Emulation

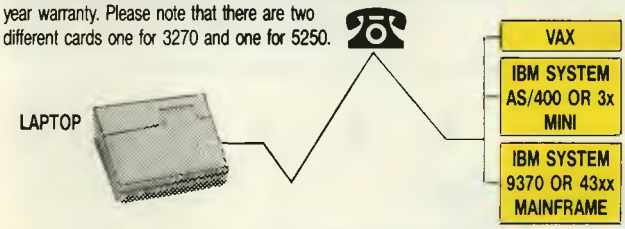
Lap Lan — Laptop Networking

Modem — Laptop/Dedicated Internal

Weltec 1.2MB

Remote Terminal Emulation and Local 3270

Fully supports all IRMA and IBM emulation, file transfer, and application software. In addition it automatically configures itself to run with IRMA or IBM software without jumper changes. The unit is packaged with IND$File Transfer support and a 3270 emulation package which supports most popular emulation programs. IBM 3278 and 3279 in both CUT and DFT modes and IRMA2 in CUT mode.
Microcontroller-CHIPS 82C570 (allows concurrent DOS/3270 operation.
Interface-RG62AU Coax via BNC connector on rear bracket. Control Units — Compatible with IBM 3276, 3274 and 3174 locally or remotely attached. (Maximum cable length of 1.5 km.)
It allows remote terminal emulation for your laptop in both 3270 and 5250 SDLC environment. Included on the card is a 2400 baud modem (also capable of Hayes-compatible asynchronous communications).
3278 and 3279 (WINDSFILE), 5251, 5294 emulation software provided. It comes with a 2 year warranty. Please note that there are two different cards one for 3270 and one for 5250.



	1 OFF	2 OFF	3 OFF	4 OFF	5 OFF	10 OFF
RTE	$1604	$1593	$1582	$1570	$1559	$1507
Local 3270	$1086	$1078	$1070	$1062	$1053	$1021

LAP LAN — LapTop Networking

Lap Lan supports an Ethernet environment. The card mounts internally in the slot usually referred to as the 'modem slot'. Ethernet specifications — IEEE 802.3 Lap Lan will connect to A 10 BASES Ethernet, 15 pin female connector provided as well as A 10 BASES Cheapernet, BNC coax connector provided. It comes with Novell Netware compatible drivers and is an NE1000 Clone. It is covered by a 2 year warranty.

New product upgrade: Now 3COM Compatible.

	1 OFF	2 OFF	3 OFF	4 OFF	5 OFF	10 OFF
LAP LAN	$1086	$1078	$1070	$1062	$1053	$1021

MODEM — Laptop/Dedicated Internal

EasyTalk internal board modems for portable computers put you in touch with the office, sending and receiving data without a hitch. The EasyTalk series includes unexpected extras. For instance, vital battery power is conserved when it is not required. EasyTalk modems are internal to the machine, so you automatically transport your modem when you take your portable computer on the road.
Modem Features: • Procomm Communications software included • Two-year warranty • Hayes-compatible • International (CCITT) compatible • Auto-answer, Auto-dial, Auto-speed detect • Dual phone jacks (most models). **PART #: T324D (EasyTalk T2400DI) - Toshiba Dedicated** Dedicated internal board, 2400 baud modem for the Toshiba T1200 and T1600 laptop computers. (Does not use expansion slot).
Easy Talk internal baud modems for portable computers put you in touch with the world. Fully Hayes compatible and has as standard features auto answer, auto dial and is compatible with COMPAQ — EPSON — MITSUBISHI — NEC — TOSHIBA — SHARP — ZENITH. Comes with a 2 year warranty. This is a 2400/1200/300 baud modem and comes complete with software and cables. Serial port and modem on the one board also available and can be selected by software for ease of use.
New product release — Apple Laptop Modem.
* Compaq — Epson — Mitsubishi — NEC — Sharp — Zenith.

	1 OFF	2 OFF	3 OFF	4 OFF	5 OFF	10 OFF
* Modem	$571	$566	$561	$556	$551	$543
Toshiba Modem	$511	$506	$501	$496	$491	$478
$559	$555	$550	$545	$540	$527	

Weltec 1.2MB External Drive to suit Toshiba

The Bridge between your 5¼" data and your laptop

Features The Transportation Corridor
Congratulations! You've finally got that state-of-the-art laptop computer with the 3.5" disk drive. Unfortunately, all the data you need to access is still on your lod 5.25" diskettes. That's where WELTEC can help.
WELTEC's 525 external floppy drive subsystem is designed to allow you to easily transport, share and convert data between your laptop computer and PC's XT's and AT's. Not suitable for all T1200 series.

	1 OFF	2 OFF	3 OFF	4 OFF	5 OFF	10 OFF
1.2MB	$689	$681	$673	$665	$657	$640

Call your nearest dealer today. . .

SYDNEY (02) 369 1611
MELBOURNE (03) 525 2266

ECI

Enhanced Computer International Pty Ltd
Level 2, Suite 6, 620 St. Kilda Rd, Melbourne Vic. 3004
Telephone (03) 525 2266 Fax (03) 525 1592
Level 5, Suite 8, 1 Newland Street, Bondi Junction, Sydney, NSW 2022
Telephone (02) 369 1611 Fax (02) 389 2893

FOR THE LAST 2000 YEARS, HE'S MADE THE WORLD GO ROUND.

CUPID. "Completely Universal Processor I/O Design."

Exclusive to AST, CUPID-32 architecture is so advanced, it makes all other PCs inadequate.

Now power and performance know no limits as CUPID-32 provides a progression to more powerful computing, as business needs demand.

Supporting all constant components on the Systems board and all changing components on a dynamic Processor board, CUPID-32 makes upgrading as simple as replacing the Processor board. And takes about 60 seconds.

Now an AST Premium 386/SX may be upgraded to a 386/25, 386/33, 486/25 or 486/33, retaining the value of the initial computer investment, whilst greatly enhancing the system's processing power.

CUPID-32 from AST Research. The natural progression.

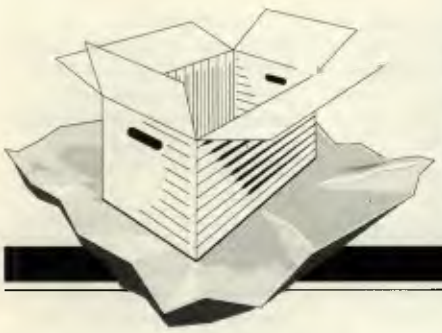
AST® RESEARCH

AST Research ANZ Pty Limited. Level 3, 178 Pacific Highway, St Leonards N.S.W. 2065. Telephone (02) 906 2200 Facsimile (02) 906 2316

A R C H I T E C T U R E

C U P I D 3 2

NOW, HE'S TURNING THE COMPUTER WORLD UPSIDE DOWN.



Windows 3.0 ups the ante	**Page 27**
Enhancing Borland products with Paradox Engine	Page 28
Build your own programs with Object Professional	**Page 37**
Works 2.0: an impressive low-end integrated package	Page 38
Linking Debden diaries to the PC with Desk Organiser	**Page 40**
Applause II: an overhauled version of Draw Applause	Page 44
In-house four-colour separations with Aldus PrePrint	**Page 46**

Windows 3.0 set to extend the life of DOS

APC took a look at a beta copy of Microsoft's latest version of Windows — which should be released within the next month — and found a superb product. It should be noted at the outset that the version reached us with no documentation; therefore, we were unable to optimise it for all the machines it was tested on.

Microsoft's programmers have eradicated many of the restrictions and niggling irritations that haunted previous versions of the operating environment. Ordinary DOS applications that run from within Windows are hardly any slower than those same applications running under straight DOS. To start an application you no longer have to search through your disk for the EXE file — all the programs are presented as icons. In Windows 3.0 you are not restricted to four on-screen colours, but can use the full 16 shades provided by standard VGA.

Programs are represented by icons, but they are not grouped into folders as on a Macintosh. When you exit Windows the program will save your current window arrangement in much the same way as does the Mac when you close down the machine. Like the Mac's Clean Up Window option, Windows 3.0 has an Arrange Icons menu item. However, it also has automatic window arrangement controls that can tile or cascade windows like Presentation Manager applications.

In fact, in spite of the icons, Windows 3.0 is most like Presentation Manager, especially with the File Manager (which is almost identical) and the organisation of programs into groups. When Windows 3.0 opens on-screen, it has four windows either already open or represented by icons at the bottom of the main Program Manager window (the Program Manager window replaces the MS-DOS Executive of earlier Windows versions). Two of these windows contain applications, split appropriately into Windows and Non-Windows. The other two windows are Main and Accessories.

Most of the Accessories' group of utilities will be familiar to users of earlier versions of Windows. It has a Notepad, Cardfile, Calendar, Calculator, Clock and Terminal. Reversi has disappeared and Windows Write, Windows Paintbrush and the PIF Editor are now also set up with their own icons in the Accessories window. There is a new accessory called Recorder, which is a macro builder that can record oft-repeated operations so the user can replay them with a single keystroke.

In the Main window, you will find icons for the File Manager, the Control Panel, the Print Manager, the Clipboard and the Windows Setup. There is also a new facility called DOS Prompt, which will take you right out of Windows to DOS in much the same way as the System command in Lotus 1-2-3.

Windows 3.0 includes an upgraded version of Windows Paint

When you get to DOS you will find that you have lost some memory to the Windows kernel. Just how much seems to vary depending how you have set up Windows 3.0. In our testing we found that, at most, Windows sat in about 50K of DOS's 640K. This lets you run most software and then return to Windows by simply typing 'exit'.

The Windows 3.0 Control Panel is an improvement over that shipped in previous versions of Windows. All the options are much the same but they are now activated through icons. (Microsoft must have employed a professional graphic designer to design this part of the program.)

If you want to customise Windows 3.0, but don't necessarily want choose the colours for each element individually, you can choose from a number of Color Schemes. These include such gems as Fluorescent, a colour scheme designed to send the average user blind; and Rugby, which is a combination of maroon and light yellow. The Desktop option can be used to change the background screen — whimsically called Wallpaper. If you are so inclined, you can have a picture of a chessboard with the pieces sailing through the air as a backdrop for your windows.

Windows 3.0 was tested on a variety of machines. It ran quite happily on a 286

At a glance

Windows 3.0

Distributor:	Microsoft
Telephone:	(02) 452 0288
Requires:	At least a 286 with 640K of memory
Price:	Not available at the time *APC* went to press
In short:	Windows 3.0 will certainly extend the life of DOS. It provides most of the capabilities of OS/2 version 1.2 in a DOS environment.

machine with 640K of memory, but to successfully handle multi-tasking it had to be run on a 386 with 2M of RAM.

Windows 3.0 normally makes use of protected mode, and so it likes extended not expanded memory. However, unlike Windows/386 it doesn't spit the dummy on machines with expanded memory and you don't get the annoying messages about the memory set-up that the previous version would issue if it detected expanded memory. One of the nice things about running in protected mode is that it handles fatal errors without pulling the whole machine down around its ears.

If you only have expanded memory and/or you want to run programs written for previous versions of Windows, you will want to force Windows to run as a real mode application only. You can do this by adding the /r switch every time you start the environment.

According to Microsoft, any application written for earlier releases of Windows will run quite happily in version 3.0, providing the application obeys all the memory management rules for those versions of Windows. According to our testing, not many major applications do obey all these rules. In fact, the only application we found that could run with Windows 3.0 in protected mode was Microsoft's own Word for Windows.

Microsoft has built support for networking into Windows 3.0. According to stories in the computer press, the program will handle networking tasks in the background, and the file manager has support for network drives. However, we were unable to test this part of Windows 3.0 as the necessary drivers were missing from the beta version.

The support for peripherals in Windows 3.0 is impressive. It has an extensive range of drivers for a variety of printers and unless you use something exotic you'll probably find it's supported.

Microsoft has improved the installation procedure. It is a slick piece of work with none of the tedious disk swapping characteristic of earlier versions. The beta copy came on five high-capacity disks and installation involved simply inserting the disks in order. The set-up procedure automatically searches for applications on your disk(s), and creates icons and PIFs for them. Once you have completed the set-up you should be ready to go, with most of your applications already in place as icons in the Windows and Non-Windows Applications windows.

Josephine Bell

Paradox Engine offers industrial-strength database library to C developers

Borland International's Paradox Engine, a database library for C programmers, lets your applications tap the power of Paradox. Extracted from the core of Borland's relational DBMS, the $695 Paradox Engine provides C programs with the database technology found in Paradox 3. Since Borland has already incorporated the Engine into its Quattro Pro and SideKick for the Presentation Manager, you'll now be able to write Engine applications that can share data with these programs, add new capabilities to them, and use them as front ends as well.

While it's a pleasant surprise to find this level of compatibility extended throughout a commercial product line, it's amazing that Borland has released the technology to developers. The implications of the release are considerable: if you've ever wanted to add your own extension and enhancements to Borland products, the Engine provides a means of doing so. For instance, giving Paradox the ability to receive downloaded mainframe data or adding application-specific financial analysis capabilities to Quattro Pro are a natural for Engine-based applications; a developer can write an enhancement as a C program that uses the Engine to place downloaded or updated data into the appropriate table. And since the Engine includes a full complement of Paradox's multi-user concurrency features, you can run an Engine application on one workstation while it simultaneously updates Paradox tables used by another.

Paradox Engine provides a common development ground for Paradox and Turbo C

Combined with the Engine, interactive Paradox provides a formidable application development environment for C programmers. For instance, if you need to interactively edit or modify an Engine database, you can use Paradox. You can build prototype C applications and database utilities with Paradox's PAL script language before you begin writing a single line of C. Or you

NOW YOU DON'T HAVE TO FLY HOME WITH YOUR DATA

Pocket Rocket™1234

On its own, a laptop is an island, mute to the rest of the world. But for around $649 you can add a NetComm Pocket Rocket 1234 modem and suddenly your laptop or portable PC will be able to communicate anywhere, at any time.

A Pocket Rocket will let you dial into your office computer and drop a rush sales order into Head Office from a bush motel. Update your financial data minutes before your next board meeting in New York. Or send home the last pages of the Annual Report when you land in Port Douglas. Impressive.

If you have a laptop or portable PC and you don't have a Pocket Rocket, you're not only underprivileged. You're underproductive.

NetComm

EVEN FURTHER AHEAD

NetComm Australia Pty. Ltd. P.O. Box 284 Pymble NSW 2073
Telephone: NSW: (02) 888 5533 Vic: (03) 696 2222 Qld: (07) 831 1409 WA. (09) 367 0613
New Zealand: Auckland: (09) 479 2400 Wellington: (04) 650 140

Please send me more information on Pocket Rocket 1234.

NAME _____

COMPANY _____

ADDRESS _____

POSTCODE _____ PHONE _____

APC01

HH NET580

At a glance

Paradox Engine

Distributor:	Borland Pacific
Telephone:	(02) 418 7330
Price:	$695; $295 for Borland users (offer expires June 30, 1990)
Requires:	512K of RAM, Turbo C 2.0 or Microsoft C 5.1, DOS 3.x or later
In short:	An industrial-strength database library for C programmers who use Microsoft C or Turbo C. Offering complete compatibility with Paradox 3 and Borland's other products, the Engine can be used to extend Paradox or to write custom database applications. There are no royalties on programs developed with the Engine.

can use PAL to write an application's interactive front end while relegating the time-critical or hardware-specific sections to an Engine program (executed from inside Paradox via the PAL RUN command). The Paradox Report Generator can operate against Engine application tables, and you can run an Engine application against the results of a Paradox QBE query. If you want to use Quattro Pro to provide a spreadsheet-style front end for your C programs, go ahead — the possibilities are nearly limitless. And there are no royalties on programs developed with the Engine.

The Paradox Engine comes with libraries for both Microsoft C 5.1 and Turbo C 2.0 in the same package (Borland expects to release a version for Turbo Pascal in the near future). Since it provides only DBMS services, you're not kept from using your favourite libraries for windowing, graphics and communications.

The Paradox Engine consists of over 70 functions that provide all manner of database services to a C application. You can perform global operations on Paradox tables and access individual records and fields. The Engine lets you apply password protection to a table via Paradox's table-encryption and decryption facilities. With full multi-user concurrency and record locking, you can control the extent to which other applications can share tables with your programs. Further, the Engine lets your programs detect changes to tables it shares with other applications, so you can implement your own version of Paradox's auto-refresh facility.

Paradox Engine presents a consistent application programming interface; tables and records are treated as objects that can be referred to via handles. The handles are provided by functions that open the objects. Each function returns zero if it's successful or a non-zero error value, simplifying how you write Engine code. All Engine functions begin with a 'PX' prefix that identifies them as part of the Engine library, lessening the chance of a conflict with other libraries that you might link with your program.

While the Engine is a viable tool, it could stand improvement in some areas. For example, while it offers full support for Paradox's indexing scheme, there is no Engine function that lets you sort a table (although a workaround example is provided). Nor is there support for using stored queries generated by Paradox's QBE or for Paradox's high-level set-based relational facilities. The Engine will add at least 80K to your program, and Engine libraries are provided only for the large memory model. Further, Borland has not provided enough high-level features to the API (like the dBASE USE command), or a high-level implementation of 'auto-refresh'. Finally, both the current version of Paradox and the Engine suffer from a lack of EMS support.

The Engine's greatest potential strength *and* weakness lies with Borland itself. When other companies have released proprietary technology, they've often failed to keep it up to date and move it quickly enough to new environments. Thus, it will be up to Borland to ensure that the Engine remains compatible with, and continues to benefit from, the features added to subsequent versions of Paradox. The opportunity to build applications that share data and interact with Borland's other products makes the Paradox Engine a worthy database development tool for C programmers.

Richard Hale Shaw

RENARD L100 LAPTOP - TOP OF ITS CLASS

* 20 MB Hard disk version also available.

- Smaller than the TOSHIBA T1200 & T1000
- Faster than the ZENITH Minisport
- Lighter than the COMPAQ LTE
- More I/O Ports than the NEC Ultralight
- Costs less than an executive's BRIEFCASE

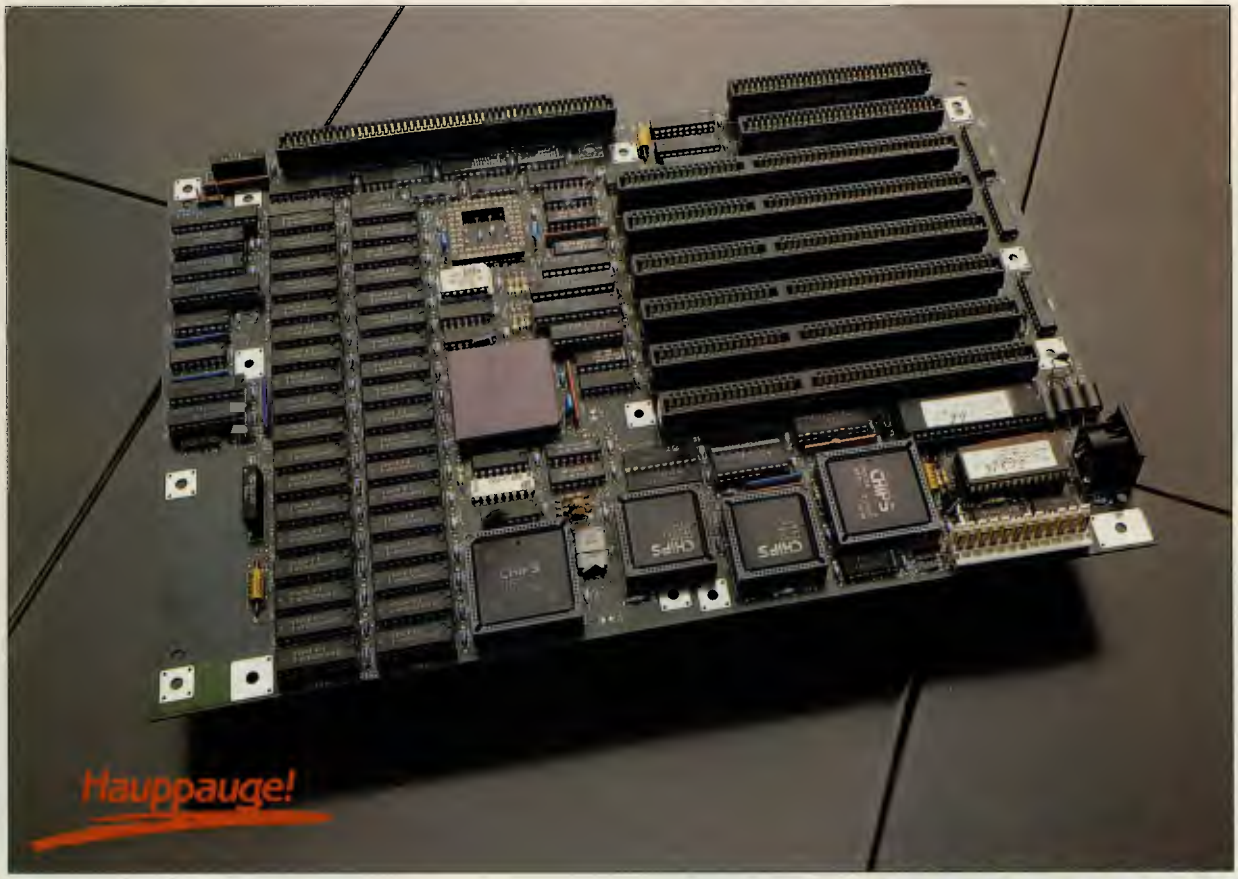
Easily fitting inside a briefcase, the Renard L100 has all the functionality of a desktop PC. So now you can truly bring your office wherever your business takes you. The battery powered L100 boasts an impressive array of features: full IBM compatibility with a 9.54 MHz 80C88 processor, an industry standard 3.5" floppy disk drive, an easy to read backlit screen, built-in DOS, 640K or 1 MB of RAM, and all this in a compact package weighing around 3 kilos. So get cunning and contact your nearest Renard dealer for a hands-on demonstration.

Melbourne: (03)663 6509, 525 2622
Sydney: (02)555 7466
Brisbane: (07)252 2011
Adelaide: (08)234 0994
Canberra: (062)88 4555
Perth: (09)227 8952
Hobart: (002)31 1189
Darwin: (089)81 6100

RENARD
Your business cunning

Distributed by Veridata Australia Pty. Ltd.
Level 1, 165 Gertrude Street, Fitzroy, Victoria.
Telephone (03)417 7055

UPGRADE PRODUCT OF THE YEAR!



The latest 20Mhz Motherboard for the **POWER USER**

WESTERN
C O M P U T E R

20Mhz Motherboard

Features include 2 or 4 megabytes of on board memory, support for OS2, battery backed clock and calendar and memory expansion up to 64 megabytes.

The Savings

Using Western's Hauppauge motherboard upgrades, your existing computer system is given a new lease of life at a fraction of the cost of a replacement computer.

The Range

Western Computer stock a range of motherboards in Brisbane for immediate delivery. This range includes 16Mhz and 20Mhz; 25Mhz and 33Mhz (both with cache), in formfit for PC, XT, AT, Compaq (Portable and Plus).

Hauppauge

Specialist manufacturers of motherboards since 1984, Hauppauge Computer Works pride themselves on their ability to integrate the latest quality components into new products ahead of the competition.

Western Advantage

Our regular shipments of hardware from the U.S.A ensures that new products are available in Australia only two weeks after first release in the U.S.A. Western offer the latest technology first.

Western's Computers

The highly regarded Hauppauge Motherboards form the base of Western's 386 Product Range.

139 Sandgate Road Albion
Brisbane Qld. 4010
Phone (07) 262 3122
Fax (07) 262 4957

Please send me more information on your range of Motherboards.

Mr/Mrs/Ms _____

Company _____

Title _____

Address _____

_____

_____

Phone _____

OEM/DEALER ENQUIRIES WELCOME

NATCOMP

THE RIGHT CHOICE

PLENTY OF PARKING

OPEN MONDAY–SATURDAY

Specialising in Network and Accounting Systems

SOFTWARE

Lotus 123 V2.2	$ 650
Lotus 123 V3.0	$ 850
DBase IV	$ 870
Wordperfect V5.1	$ 545
Harvard Graphics	$ 545
Norton Utilities Advanced	$ 145
XTree Pro	$ 140
Turbo Pascal V5.5	$ 160
Turbo C V2	$ 160
Microsoft Mouse	$ 205
Microsoft Word for Windows	$ 535
Microsoft Quick C V2.0	$ 135
Microsoft Word V5	$ 455
Microsoft Works V2.0	$ 210
Ventura Publisher V2.0	$1095
Pagemaker V3.0	CALL
Timeline Project Manager V4	$ 799
Turbo Pascal Professional	$ 285
Quattro Pro	$ 595
PC Tools Deluxe V6	CALL
Laplink III	$ 150
Crosstalk XVI	$ 199
Corel Draw	$ 695
Fastback Plus	$ 199

CALL FOR FULL SOFTWARE RANGE

HARD DISK DRIVES

Seagate 40Mb + Cont (XT)	$ 575
Seagate 20Mb + Cont	$ 499
Miniscribe 44Mb V/Coil	$ 850
Miniscribe 20Mb V/Coil	$1095
CDC Wren II 51Mb V/Coil	$ 850
CDC Wren 100Mb H/H (ST506)	$1995
Plus Hardcard 40Mb	$1100
Priam 170Mb 16Ms	$1499

CALL FOR FULL HARD DISK RANGE

NETCOMM MODEMS

Datalock 1234 SA	$995
1200 Inmodem	$385
1234 Inmodem	$565
Automodem 24/24	$535
Automodem 1234	$615
Smartmodem 1234 SA	$765
Smartmodem 2400 SA	$690
Pocket Rocket Modem 1234	$525
Smart M4 1234 SA	CALL
Smart M5 12345 SA	CALL

CALL FOR FULL NETCOMM RANGE

PRINTERS

Oki 172 9 Pin, 80 Col, 180 CPS	$299
Oki 182 Turbo, 80 Col, 220 CPS	$425
Oki 380 24 Pin, 80 Col, 150 CPS	$695
Oki 321 9 Pin, 136 Col, 300 CPS	$895
Oki 391 24 Pin, 136 Col, 270 CPS	$1095
Oki Laser 400, 4PPM 512K	$2695
Epson Range	CALL
Roland Plotters	CALL
Hewlett Packard Lasers	CALL

CALL FOR FULL PRINTER RANGE

GENERAL HARDWARE

Hyperace 286 Super +	$585
Hyperam AT 1Mb	$695
Intel 8087-1 (10MHz) Co-Pro	$335
Intel 80287-10 (10MHz) Co-Pro	$445
Intel Above Board + 512Kb	$850
IRMA 3270 Comms Card	CALL
Ethernet Cards	CALL
Netcomm PC Fax Card	$995
Toshiba 3.5", 1.44Mb Int Floppy	$195
Computer Shuttle Stands	$229

CALL FOR FULL HARDWARE RANGE

LOGITECH

MOUSE SERIES 9
SERIAL, PS/2 OR BUS VERSION

- High Resolution 300 DPI • 3 Buttons
- Comfortable Ergonomic Design
- Includes Logi Menu & Pop-up Dos Software

$170

TRACKMAN
SERIAL OR BUS VERSION

- High Resolution 300 DPI • 3 Buttons
- Requires little desk space • Includes Logi Menu & Pop-up Dos Software

$185

SCANMAN PLUS

- 400 DPI Resolution • Wide Scanning Area (4") • Scans into Ventura, Pagemaker, WordPerfect, MS Word & Windows • File Formats • Includes Paint Show Plus Software

$399

CALL OUR CORPORATE CENTRE NOW FOR FURTHER PRODUCT RANGE

YES, I MEAN BUSINESS, PLEASE

- ☐ Send me the NTA Product Catalogue
- ☐ Tell me about NTA Corporate Volume Purchase Plan
- ☐ Place me on the NTA Data Base

NAME _____ POSITION _____

COMPANY _____

ADDRESS _____

PHONE _____

APC

NATCOMP TECHNOLOGY AUSTRALIA (NSW)

THE RIGHT CHOICE

SYDNEY

133 Victoria Road Rozelle NSW 2039

Ph **(02) 555 7466** Fax **(02) 555 7470**

Prices and availability subject to change without notice.

NATCOMP

The right choice

with

RENARD

laptops

RENTAL AND LEASING facilities available at competitive rates

OPEN MON–FRI 9-5.30 pm SAT 9-1 pm

Just released! 386-20MHz Battery powered

RENARD L 3 0 0

- 386-20MHz
- 2Mb RAM
- 40Mb Hard Disk
- 3.5" 1.44Mb floppy
- VGA screen
- Detachable keyboard
- Battery powered
- 6.4Kg
- And more!

Also 286 Battery powered laptop available.

$7495

RENARD L 1 0 0

- 640Kb RAM-10MHz
- 80C88 16 bit processor
- 3.5" 1.44Mb floppy
- Battery powered
- 3.1Kg weight
- Serial, Parallel, Video Port
- Real time clock
- Supertwist LCD screen
- And more!

Also 20Mb Hard Disk available: $2695.

$1550

CALL OUR CORPORATE CENTRE NOW FOR FURTHER PRODUCT RANGE

YES, I MEAN BUSINESS, PLEASE

- ☐ Send me the NTA Product Catalogue
- ☐ Tell me about NTA Corporate Volume Purchase Plan
- ☐ Place me on the NTA Data Base

NAME _____ POSITION _____

COMPANY _____

ADDRESS _____

PHONE _____

APC

NATCOMP TECHNOLOGY AUSTRALIA (NSW)

THE RIGHT CHOICE

SYDNEY

133 Victoria Road Rozelle NSW 2039

Ph **(02) 555 7466** Fax **(02) 555 7470**

Prices and availability subject to change without notice.

VTA 0126

There is only one NATCOMP
There is only one SALE

Samtron Computers
from
SAMSUNG INFORMATION AUSTRALIA

RENTAL AND LEASING facilities available at competitive rates

OPEN MONDAY - SATURDAY
PLENTY OF PARKING

We specialise in Corporate Staff purchase plans

All Samtron Computers come with 12 months Honeywell warranty Australia wide

SAMTRON PC120 AT LAPTOP

☑ 12.5MHz ☑ 3.5" 1.44Mb FDD ☑ 40Mb Hard Disk 25M/Sec access ☑ 640Kb RAM ☑ MS DOS 3.3 ☑ 84 Enhanced Keyboard ☑ 192mm x 144mm Gas Plasma Screen ☑ 640 x 400 Pixel Graphics ☑ 6.4Kgs ☑ Honeywell 12 months warranty ☑ Serial Parallel Printer and Video Ports ☑ External 5¼" FDD Port ☑ External Keyboard Port.

Stylish Samtron

$2999

SAMTRON 88S - XT EGA

☑ 4.77MHz/10MHz 8088-11 ☑ 5¼" 360Kb FDD ☑ 40Mb Hard Disk 40Ms ☑ 640Kb RAM ☑ MS DOS 4.0/GW Basic ☑ 101 Enhanced Keyboard ☑ Small footprint/Low profile ☑ Honeywell 12 months warranty ☑ Serial/ Parallel Ports ☑ Mouse Port ☑ Games Port ☑ EGA Card ☑ Samtron 14" EGA Monitor

Samtron Strength

$1995

CALL OUR CORPORATE CENTRE NOW FOR FURTHER PRODUCT RANGE

YES, I MEAN BUSINESS, PLEASE

☐ Send me the NTA Product Catalogue
☐ Tell me about NTA Corporate Volume Purchase Plan
☐ Place me on the NTA Data Base

NAME _____ POSITION _____
COMPANY _____
ADDRESS _____
_____ PHONE _____

NATCOMP TECHNOLOGY AUSTRALIA (NSW)
THE RIGHT CHOICE

SYDNEY
133 Victoria Road Rozelle NSW 2039
Ph **(02) 555 7466** Fax **(02) 555 7470**

Prices and availability subject to change without notice.

There is only one NATCOMP

There is only one SALE

Specialising in Network and Accounting Systems

WHILE STOCKS LAST

Samtron Computers
from
SAMSUNG INFORMATION AUSTRALIA

SAMTRON 286S - AT VGA

☑ 12MHz/80286 ☑ 5 1.4" 1.2Mb FDD ☑ 45Mb Connor V/Coil HDD 25Ms ☑ 1Mb RAM ☑ MS DOS 4.0/GW Basic ☑ 101 Enhanced Keyboard ☑ Small footprint ☑ Honeywell 12 months warranty ☑ Serial Parallel Port ☑ VGA Card ☑ Samtron 14" VGA Monitor

Superior Samtron

$2795

NTA 0118

CALL OUR CORPORATE CENTRE NOW FOR FURTHER PRODUCT RANGE

SYDNEY
133 Victoria Road Rozelle NSW 2039
Ph **(02) 555 7466** Fax **(02) 555 7470**

Prices and availability subject to change without notice.

NATCOMP TECHNOLOGY AUSTRALIA (NSW)
THE RIGHT CHOICE
(Incorporated in NSW)

YES, I MEAN BUSINESS, PLEASE
☐ Send me the NTA Product Catalogue
☐ Tell me about NTA Corporate Volume Purchase Plan
☐ Place me on the NTA Data Base

NAME _____ POSITION _____
COMPANY _____
ADDRESS _____
PHONE _____

APC

Relief for Parched Minds.

In programming, your thirst for knowledge never quits! Especially when you are fired up by the freedom and flexibility you get from Clipper's open architecture system. So you're invited to tap the collective expertise of the worldwide Clipper community by attending the first Australian *Nantucket Developer Conference* in Sydney, May 21st through the 23rd, at the Airport Hilton.

Join Nantucket's key technical staff as well as members of the Clipper development team for three days of instructional technical sessions. All sessions will be built around the special programming advantages packed into Clipper 5.0. It's the best way to ensure you get the fastest possible start with new Clipper technology, from user-defined commands to code blocks and alternate database drivers!

Don't miss this chance to replenish your Clipper programming skills. *Reservations are limited,* so call to hold your place today! You'll find the Australian Nantucket Developer Conference the perfect oasis for a thirsty mind!

NANTUCKET
DEVELOPER CONFERENCE
AUSTRALIA 1990

Call Now to Reserve! Ask about user group discounts!
Organised by Management Technology Education

(008)-024-083 Toll Free

(02)-261-5555 • (02)-261-5959 FAX

Nantucket

Nantucket Corporation, 12555 West Jefferson Boulevard, Los Angeles, CA 90066 USA 213/390-7923 FAX: 213/397-5469 TELEX 650-2574125 Nantucket, the Nantucket logo and Clipper are registered trademarks of Nantucket Corporation. Other brand and product names are used for identification purposes only and may be trademarks or registered trademarks of their respective holders. Entire contents copyright © 1990 Nantucket Corporation

Object Professional: first library for Turbo Pascal saves programming time

Object Professional, a library of objects — not just procedures and functions — is an essential toolkit for programmers using Turbo Pascal 5.5. The first of its kind, the $279 package from Turbo Power Software is huge, comprising a three-volume manual and eight disks of highly-compressed source code. It contains practically all the general-purpose objects you'll ever need.

If a function can be made into an object, Object Professional can do it, and the manual will explain how. The Screen Management volume discusses how to use such objects as flexible windows, menus, context-sensitive help and pick lists, among others. You'll find these objects sufficient for building an attractive user interface for your programs.

The Data Input/Output volume concentrates on file-browsing window objects, text-editing objects, data entry screen objects and even objects for hardware-specific printer support.

The third volume, TSRs and More, is a catch-all that discusses miscellaneous functions like container objects, linked lists, queues and data dictionaries that handle any Object Professional object type, including themselves. Across the three volumes, more than 130 objects and their methods are described in detail and cross-referenced to related topics.

Learning how to use Object Professional could be a problem. With 1600 pages of manuals, you might spend more time reading than coding. Fortunately, one of the provided example programs, POPHELP, is a RAM-resident, context-sensitive help program for Object Professional. One keypress helps you with whatever routine the cursor is on, including example code that you can paste into your program. If that's not enough, you can pick apart the other example programs to see exactly how TurboPower's programmers use their own objects.

In fact, the example programs show off what Object Professional can do. MAKE MENU and MAKEHELP let you whip up a prototype program with mouseable pull-down menus and context-sensitive help in an

Object Professional offers source code for its DESKPOP program, a swapping TSR that uses only 6 to 8K of RAM

IBM owners FREE OFFER ACCOUNTING

Good Accounting software is now essential.

Attaché, the biggest selling PC Accounting software, will send you a free demonstration disk and sample savings charts.

We will even include additional information specific to your type of business, size of company and areas of interest. Just tell us what they are.

Mail this FREE OFFER coupon or phone (02) 929 8700. Distributors Australia wide.

Attaché

Bullet proof reliability.

Mail to: Attaché Software Australia Pty. Ltd.
PO Box 1070, North Sydney, NSW 2059

Name.....
Company.....
Address.....
.....Postcode.....Business Phone.....
Type of Business.....
Number of Employees.....Have PC? Yes/No.....

Disk Size ☐ IBM 5¼ ☐ IBM 3½

Areas of interest: ☐ Accounts Receivable ☐ Accounts Payable ☐ Invoicing ☐ General Ledger ☐ Inventory ☐ Payroll

(Please tick) ☐ Other.....

☐ Single user ☐ Multi-user ☐ Business Use ☐ Student

Mail or phone us now on (02) 929 8700 or FAX (02) 925 0481 APC A

hour or two. The DESKPOP example program is a swapping TSR that contains a file manager, a text browser, an editor, a calculator, a calendar, a phonebook with dialer and a detailed programmer's reference chart. DESKPOP does more than many standalone products, yet its full source code is provided as an example.

Object Professional's swapping TSR technology lets RAM-resident programs of any size exist in only 6 to 8K of conventional RAM, with the rest swapped to disk or EMS. The product also provides for allocation of extended or expanded memory, keyboard macros, virtual arrays, customisation of default values and offers a sorting routine. In general, whatever you want your program to do, check first to see whether Object Professional already does it.

Object Professional requires 11M of hard disk space. If you delete the source and example files after installation, the compiled units will still occupy 1M. Fortunately, a competent installation program takes care of decompressing the files and compiling them for you.

Object Professional pushes Turbo Pascal 5.0 to the limit. For the sake of practicality, however, its programmers restricted their use of virtual methods, because the Turbo Pascal 5.5 smart linker isn't quite smart enough to strip out unused virtual methods. Whenever possible, they implemented pointers to user-defined procedures to avoid forcing the user to define descendant objects. Thus, TurboPower's programmers sac- rificed strict object-oriented style for smaller code.

Code size is definitely an issue. Programs converted from TurboPower's earlier library, Turbo Professional, to Object Professional are liable to get larger because of the smart linker's inability to remove unused virtual methods. The change in size will be most dramatic in small programs, but large programs may become too big to compile. The manual gives precise instructions on how to adjust the compiler to handle the largest possible programs.

Object Professional is much better integrated than was Turbo Professional. For example, Turbo Professional's help windows, pick windows and menus all have separate data types that control their colours, whereas Object Professional has a single 'ColourSet' object. In Object Professional-based programs, all command input (keyboard or mouse) goes through a single command handler, and all error conditions use a single error handler. This integration may recover some of the code space lost in the conversion to objects.

Object Professional is much more than a collection of source code. For programmers learning object-oriented programming, it's better than a textbook. You could create your own library of objects, possibly one that's just as good as Object Professional's, but the time you'd spend building that library would far exceed the cost of Object Professional itself. Better to stand on the shoulders of giants — use Object Professional for everything you can and concentrate your own efforts on the features that make your programs unique.

Neil Rubenking

At a glance

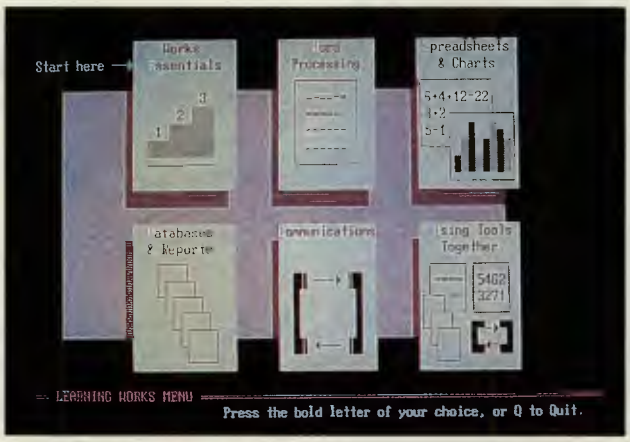
Object Professional

Distributor:	Microway
Telephone:	(03) 555 4544
Price:	$279
Requires:	512K of RAM, Turbo Pascal 5.5, DOS 2.0 or later. 640K of RAM, TASM 1.0+ or MASM 4.0+ and mouse recommended
In short:	The first library of objects for Turbo Pascal 5.5 programmers contains practically all the general-purpose objects you'll ever need in order to build your own programs.

Self-contained personal productivity package

Microsoft Works 2.0 covers the 'big five' software applications: word processing, spreadsheet, graphing, database and communications. These applications are well integrated in the sense that it is easy to prepare a report incorporating a quotation sourced from an online information service and a graph derived from a spreadsheet, with the top sheet customised according to a circulation list maintained as a database. However, Works is not so tightly integrated that the result can be treated as a single document. You can't, for example, alter a graph from within the word processor. Instead, you edit the underlying spreadsheet, which changes the graph, the current version of which will be printed by the word processor. Since each of the documents can be open at the same time, this is of no great consequence.

The user interface is built around drop-down menus and dialogue boxes. Mouse users simply point and click, while keyboarders make their selections by pressing the Alt key along with the letter or number that is highlighted in the desired selection. It is possible to move between options using the Tab and Arrow keys, but you don't always end up where you expect, especially in the more complex dialogue boxes.



The opening menu in Works' tutorial shows the application choices

The help system tries to be context-sensitive, but doesn't always manage. When I wanted help in forming a database query, it told me how to edit a database field. Since you query the database by entering criteria into the corresponding fields, I suppose it was understandable, although not very

Bytelink - with 12 ports
and up to 2MB memory

Byteway 1000+ - with 8
ports and up to 1MB

Byteway 1000 - with 4
ports and up to 1MB

Byteprint 9P - lets 8 computers
share 1 printer automatically

Byteprint 5P - lets 4 computers
share 1 printer automatically

Byteprint 3P - lets 2 computers
share 1 printer automatically

Protec
Data Managers

The network you need when you don't <u>really</u> need a network...

Networks can be great. They can let you share programs, data and resources very effectively. On the other hand, they can be very expenive, have a long learning curve, require specialist (expensive) staff to implement and support them, and can slow printing and hard disk access on the system. It boils down to this . . . if you need to run multi-user software and share files, networks are the way to go . . . if you need to share resources, ***Protec Data Managers are the way to go.***

Protec Data Managers come in many models. The **Bytelink** and **Byteway** Series provide from 4 to 36 ports, each of which may be used for output or input. Link up to 10 data managers for really large installations. Serial or parallel ports, or a combination of both. All serial ports bi-directional. Buffers from 256KB to 2MB to speed throughput. Resident and non-resident software to assist with initial configuration and make operation simple. Every convenience feature is standard.

These features make the **Bytelink** and **Byteway** Series of Data Managers excellent solutions for corporate or government resource sharing needs. Virtually an unlimited number of computers (PCs, minis, mainframes) can **automatically access and share printers, plotters and modems...and transfer files between computers.**

If your needs aren't that elaborate, the **Byteprint** Series provides excellent value. All Byteprints come with 256KB memory and provide fully automatic parallel printer sharing in three models. Incorporting the very latest technology (microprocessor control and Schotkey Schmitt trigger), **parallel printer cables of 30 metres or more may be used.**

Warranty? With the latest technology and the highest quality, Protec Data Managers carry a **twelve (12) months** parts and labour warranty.

30 Day Money Back Guarantee. We know that there is nothing which comes close to matching the features, quality or ease of use of Protec products. If you find another product that you think works better for you, simply return your Protec Data Manager, together with the name and model of the product you prefer, and we will arrange to get it for you for the difference in retail price. **You can't lose!**

So why wait? Call our **Protec Hotline** now for the name of your closest Dealer or Distributor . . . and **start saving time and money today.**

Call (02) 819 6222

or

Fax (02) 819 6930

LOGO

LOGO Distribution Services
Suite 303 Henry Lawson Business Centre, Birkenhead Point, Drummoyne NSW 2047
Phone (02) 819 6811 Fax (02) 819 6930

helpful. Despite that criticism, the range of help topics is comprehensive and an extensive set of tutorials is provided.

You can carry out the normal housekeeping operations like disk formatting and file copying from within Works, and it is also possible to run external programs. A calculator and alarm clock (supporting multiple events, either once-off or periodical) are available from each part of Works.

The documentation is very good. The reference manual runs to nearly 400 pages, and is well indexed. The only time it failed me was when I tried to find out about the 'custom menus' mentioned in Microsoft's press release. Apart from that, the clear layout and content plus plentiful screen dumps made the package easy to use.

Along with the manual there is a reference card and a glossy 'quick-start' booklet describing the use of the sample files. Some technical notes would be useful; it was by chance that I discovered that Works can use EMS memory — the only place I saw it mentioned was in the help section for Works 1.0 users! Similarly, I could find no indication of the maximum document size for each application.

Macros can be constructed either manually or by using the macro recorder. Although they can be applied to all parts of Works, the macro 'language' lacks the flow-of-control statements that allow the construction of self-running applications in packages like 1-2-3. Nevertheless, they are still useful to save keystroking during frequently-performed or repetitive operations.

Microsoft claims that Works is especially suitable for portable computers as it will fit onto one 720K disk. This is almost true. You can install Works with a couple of printer drivers on a bootable DOS disk with a little room to spare, but you will need a second disk for the help file and dictionaries. I noticed Works accessing the program disk at some unexpected times (even when I was thumbing across the main menu bar), so I also tried using it on a desktop PC with a hard disk and the result was much smoother.

Works' word processor incorporates the normal features including mailmerge, footnotes and on-screen display of character styles (eg, italics and underlining). The last item is optional — recognising that lesser machines can be a little too slow in graphics mode, Works allows the user to toggle between text and graphics, suggesting that graphics be reserved for the final tidying up of a document.

A variety of fonts are supported for printing, but are not represented on-screen. Character styles and paragraph formats can be copied from one piece of text to another, greatly simplifying a task that can be tedious and error prone. To further reduce the amount of wasted paper, the print preview command gives an outline display of the finished page with almost legible text and scaled-down graphics. A 100,000 spelling checker (using the UK rather than Australian or US spelling) and a 30,000 keyword thesaurus are a great convenience.

Works can convert files between its own format and Microsoft Word, Microsoft Interchange Rich Text Format and Document Content Architecture for import and export of documents.

It is difficult to describe the spreadsheet without running the risk of damning it with faint praise. It offers sixty-odd functions and a reasonable selection of formatting options. The maximum sheet size is 4096 rows of 255 columns, and it appears to use sparse matrix techniques to conserve memory. No surprises, and it might not impress someone for whom a spreadsheet is the be-all and end-all of desktop computing, but useful, usable and workmanlike. It is much the same with the graphing module, which offers a sufficient chart types for most applications and reasonable flexibility within them, but somehow lacks sparkle.

The communications module is fairly basic. It provides VT52 and ANSI emulation, XModem file transfers, and a buffer for received text. This buffer can contain 100, 300 or 750 lines at the user's discretion, and is used to review information that has scrolled off the screen or to cut-and-paste received text into other Works applications. The phone number and appropriate settings for individual services are saved in separate files.

Even though the majority of systems expect an 80 column, 24 or 25 line display, Works defaults to a smaller window. Full-screen operation can be selected from the Terminal Settings dialogue.

Examined in isolation, the individual components of Microsoft Works may seem a little light on features, but together they are strong enough to achieve some serious work at a realistic price.

Steve Withers

At a glance

Microsoft Works 2.0

Distributor:	Microsoft
Telephone:	(02) 452 0288
Price:	$295
Requires:	512K of RAM, DOS 2.0 or later, hard disk
In short:	Works is unlikely to appeal to the power user, but for home, professional and small business applications, it could live up to its 'all the tools you need' billing.

A failed computer link to your diary from Debden

Oh dear, oh dear. My mother always told me never to judge a book by its cover, but sometimes I am a sucker for a slick piece of presentation. I am also a sucker for products that will apparently increase my productivity.

Like many busy people, I use one of those all singing, all dancing diary systems-cum-organisers. Debden however, has now gone high-tech and decided that its diaries are incomplete without a companion piece of software.

It arranged for a Sydney software developer to write a program called Desk Organiser and Address Book. The promise is a menu-driven application, able to print to the two paper sizes appropriate to most Debden, Filofax and other diary systems of that ilk.

The software can supposedly store names and addresses in appropriate categories, print labels, automatically insert postcodes for Australian localities and track expenses. It has a scientific calculator, a stopwatch and details of world time zones, and works with an HP LaserJet, IBM or Epson dot matrix printer.

Pricing depends on the size of paper and whether you already have a diary. With diary, the larger, three-ring format costs $276, the Filofax-sized version costs

IF YOU JUST PAID $3,000 MORE THAN YOU HAD TO FOR AN 80386...

...YOU'D BE UPSET TOO!

Our name may not be as well known as some, but our TP Premier PC's are being used by over 50,000 people throughout Australia.
And we ensure reliability for our TP Premier 80386's by maintaining rigorous quality control in our assembly plants located in New South Wales, Victoria and Queensland.
That's why we can guarantee the best service and support from both Honeywell and our dealer network.

- 1 MB RAM
- VGA Colour Monitor
- MS DOS and OS/2 Compatible
- 40 Mb Voice Coil Hard Disk
- 101 Enhanced Keyboard
- RRP $3350 incl. Tax!

Honeywell one year on-site warranty

THE TP PREMIER 80386 SX...

Talk to your nearest TP Premier dealer now.

SYDNEY:	**Hi-Q Technology** 55 Regent Street, Kogarah. NSW 2217.	Ph: (02) 587 9469	Fax: (02) 587 9930
	23 Oscar Street, Chatswood. NSW 2067	Ph: (02) 413 2873	Fax: (02) 413 4604
NEWCASTLE:	**Coda Computer Services** 24 Kulai Street, Charlestown, NSW 2290.	Ph. (049) 42 1334	Fax: (049) 43 7229
A.C.T.:	**Paul Harlond Electronics** U26 The Rotunda, Fyshwick Plaza, 63 Wollongong St. Fyshwick ACT. 2609.	Ph: (062) 80 7777	Fax: (062) 80 4407
	Shop 1 Cnr. Carrington Avenue & Talbragar Street, Dubbo.		Ph. & Fax: (068) 84 2533
	Shop 15A, I.M.B. Arcade, 110 Crown Street, Wollongong.		Ph. & Fax: (042) 28 5200
ADELAIDE:	**S.A. Computers** Level 24, State Bank Centre, 91 King William Street, Adelaide.	Ph: (08) 233 5848	Fax: (08) 233 5858

TOTAL PERIPHERALS

A Powerful Editor with Fantastic Help.

BRIEF USERS SPECIAL OFFER
UPGRADE TO MULTI EDIT FROM ONLY $130

Multi-Edit

Finally! An extremely powerful editor that is remarkably easy to use.

CONVENIENCE: Edit up to 100 files or different parts of the same file in tiled, overlapping or linked windows; compile within editor with automatic error-location; individual setups for filename extensions; network support with individual workstation setups; pop-up programmer's calculator & ASCII table; smart/auto indenting, structure matching and template editing for C, Pascal, dBase, BASIC, Modula-2 and Assembler.

POWER: Multi-file Search across directories; powerful Search & Replace using regular expressions; easy-to-learn, powerful macro language; extensive user customisation options; multi-directory DOS shell with file tagging.

EASE-OF-USE!! With an extensive on-line Hypertext help system and the use of keystroke commands or a highly intuitive menu system.

Multi-Edit Professional is an extended version and also includes; a fully integrated communications module, a fully integrated spell checker, source code to all of the System Macros, and a source-level macro debugger.

Multi-Edit V4	$196
Multi-Edit V4 Professional	$325
Multi-Edit V4 Network (5 User)	$509
Multi-Edit V5 Prof Network (5 User)	$786

AMERICAN CYBERNETICS

Call today for more information

MICROWAY

PROGRAMMERS SOFTWARE

292 Chesterville Road, Moorabbin, Vic., 3189
Telephone: (03) 555 4544 Fax (03) 555 9871
BBS: (03) 555 4932 P.O. Box 219 Moorabbin

ADMAR / MW / 08

Debden's Desk Organiser needs more than impressive packaging to be successful

$260 and without diary, the software costs $200.

The diary-inclusive package is superbly presented in a 'gift box'. The software is packed in a separate box, the paper is shrink wrapped and the diary looks like the quality product it is. However, the first hint of trouble comes with the realisation that there is no software manual.

Installation is straightforward and the opening screen looks quite pretty, but that is as good as it gets. The developers, Ozcomp, wrote the application in Clipper, which gives the software a distinct dBASE feel. As Clipper code goes, it is quite passable, but Clipper also means that the program cannot run as a TSR. Diaries and address books should be able to pop up over any application. Worse, the program is not too keen on other TSRs.

Another problem is that the developers seemingly failed English at school. The minimal online help is riddled with spelling errors and bad grammar.

Figuring out how to use the software effectively is beyond even this seasoned reviewer. The only hard copy documentation comprises of two printable text files warning the user when configuring the software to specify the printer before the paper size. It is a necessary warning, however, as 'forms' is above 'printer' in the set-up menu!

Yes, the software does at least have menus, the scientific calculator calculates, the stopwatch times and the world time guide is handy. But these features don't make up for the fact that the product suffers from poor organisation.

Debden asked the developers to engineer an Agenda-like flavour, using links to cross-reference appointments, contacts, addresses, events and objectives. In theory, a user can link one with another to build up a picture of a complex task. In practice, the linking is very cumbersome.

Objectives can be linked to events and appointments, contacts and addresses. Doing so involves selecting a record, hitting L for Link, choosing the database to link to, choosing to link to a new or an existing record and then creating the link. It is possible to print out a chart of links, but a four character limit on the entries does not mean you will make much sense of it.

The diary function has weekly and monthly views — but the monthly views run over two screens so they are effectively fortnightly. The weekly view divides the day into half hour time slots, from 9am to 6pm. Selecting a date or time slot allows information to be entered, for

25 Cartridges... or 1 Cartridge

The reasons for buying *25 Cartridges in One!*™ continue to stack up! After all, why buy 25 separate cartridges when you only need one?

A combination of 172 fonts from 25 different cartridges into a single cartridge offers a perfect font for each of your business applications. Distinguish professional correspondence, enhance newsletters with sharp, exciting fonts or print full spreadsheets with Pacific Data's concise 3.6 point AFS typeface.

Whatever your use, Pacific Data's high quality fonts will give your output the polished look of typeset documents. And, you can use *25 Cartridges in One!*™ with your favorite software packages because we've included printer drivers, free of charge, for:

WordPerfect®, Microsoft Word®, WordStar 5.0®, Windows®, PageMaker®, Excel®, and MultiMate®,

to name just a few.

25 Cartridges in One!™ stands alone with its 172 quality fonts. It's the single cartridge solution for your laser printer!

You can purchase *25 Cartridges in One!*™ from your local dealer or call Mitsui Computer for the dealer nearest you.

PACIFIC DATA PRODUCTS

Sydney	Tel (02) 452 0452	Fax (02) 452 0481
Melbourne	Tel (03) 882 8866	Fax (03) 882 7073
Brisbane	Tel (07) 369 7799	Fax (07) 368 1636
Canberra	Tel (062) 81 1977	Fax (062) 81 3719
Perth	Tel (09) 470 1299	Fax (09) 470 1327

Mitsui Computer

Head Office: Unit 1/14 Aquatic Drive, Frenchs Forest, NSW 2086

AFS and *25 Cartridges in One!* are trademarks of Pacific Data Products, Inc. All other company and product names are trademarks of the company or manufacturer respectively.
Copyright 1989 Pacific Data Products. Inc.

At a glance

Desk Organiser and Address Book

Distributor:	Debden
Telephone:	(03) 645 1888
Price:	$276 with diary; $200 without
Requires:	IBM-compatible PC, 640K of RAM, hard disk, DOS 2.0 or later
In short:	A good idea, but a poor implementation. For a computerised diary, look at other products such as SideKick.

example an individual's name, address, phone number. A commendable feature is that users can set up categories of events, contacts and so on, selectable from a menu that appears at the appropriate data entry point.

A similar scheme is used to automatically insert postcodes, though it is limited to four or five postcodes for each capital city. Many more postcodes are needed to make the feature workable.

The diary function has other handicaps. The duration of an appointment cannot be entered and the display in the month or week view is restricted to six characters. In the printed version, only the first four characters of the name and appointment character appear. This matches the month to a spread format of the diary, but the information value is virtually nil.

The trick, according to the developer, is to configure the software to print to an A4 page. Now this is the sort of information users need to know. Context-sensitive online help is available and appears in a 24 line by 40 column window. It has no search facility, and is no substitute for a proper manual.

Addresses are divided into Contacts and Addresses. The difference is minimal but field lengths are too short in both categories, and when records are entered, there is no indication of whether overtype or insert mode is being used.

The 'To Do' list and notepad provide full page printouts but are not linked to other modules. Comment fields associated with database records only print to six lines.

A finances menu lets users record incomings and outgoings. They are not linked to any other module and do not update bank balances. The only clever feature is that expenses can be categorised. There seems little point in this section of the program; the built-in disk copy and format utilities do at least have a purpose.

This all adds up to a piece of software that is totally inadequate. The developers say that they are working on a better version, including features such as links to Casio and Sanyo pocket organisers, but they need to go a long way to have a good product.

If you want to link your diary system and your computer, look at some of the pop-up utilities such as SideKick and PC Tools. They may not print pages to fit your diary, but they are TSR, easy to use and do much more than this sorry little application for the same amount of money.

Kester Cranswick

Applause II: reason to switch from Harvard Graphics and Freelance?

Ashton-Tate's original Draw Applause drew little applause or market share. Applause II, a considerably overhauled version, handles charting, drawing and on-screen presentations with a fluidity and ease of use not found in either Harvard Graphics or Freelance Plus — and it does all this in a mere 512K. However, Applause's uneven charting alternative and limited selecting tools make you wonder whether it's worth switching from these old favourites.

Applause II is the first DOS-based presentation graphics program that makes intelligent use of the mouse without running under Microsoft Windows. The $775 program uses a Windows-like interface, with lots of pull-down menus and pop-up dialogue boxes. The inclusion of two Bitstream fonts is another welcome addition.

The program has three separate elements — Drawing, Charting and Presenting — each with its own set of tools. As in past versions, once you move a chart over to the Drawing component for embellishment, you lose any link to data — a serious shortcoming.

Charting components are not directly manipulatable; you assign attributes from a parts list that changes depending on your chart type. This approach is only slightly more interactive than the design-by-forms technique used by Harvard and Freelance. Despite the addition of some data-import formats, warm links, and a variety of new chart types and chart templates, you'll find there are many things you can't do.

The charting window in Applause II displays further layout options

For example, you can't have a line in a scatter plot or line markers on a line chart, and selecting 3-D bars will more often than not cause some of your variables to hide behind one another.

Colour and special effects are the program's high points. Applause's distributed-shapes effect is a feature usually reserved for serious drawing programs. The selections of clip art, especially the backgrounds, are inspiring. Built-in colour palettes are resplendent, and clicking on any of the primary palette colours brings up a secondary list of shades. Graded backgrounds were never so easy to create. Graphic import from .GIF, .PCX, .TIF, .CGM and more formats scores high marks, though Applause stumbles

It will change the way networks work.

Introducing The Wyse Networker. It delivers all of the power and capability of a 12.5 MHz 286 PC.

With all the styling and ergonomics of a Wyse terminal.

And it works with virtually any network, from 3Com and Novell to IBM Token Ring and Ethernet.

The Wyse Networker will fit comfortably on less than a square foot of desk space. Yet it comes loaded with a full megabyte of RAM and built-in VGA.

The all new Wyse Networker. Only a company that's a leader in both personal computers and computer terminals could come up with a product like it. Which is why Wyse Technology is the company that did.

WYSE is a registered trademark of Wyse Technology, Inc. Other trademarks/owners: 3Com/3Com Corp.; Novell/Novell, Inc.; Ethernet/Xerox Corp.; Token Ring, IBM/International Business Machines.

Distributed by Imagineering, MPA, The Great Escape Company.

FREE–SEND TODAY OR CALL (02) 888 7455.

Please send me details on the ☐ Wyse Networker and/or your range of ☐ Terminals ☐ Monitors ☐ Systems/PCs PLUS ☐ List of Distributors

Name:_____

Position:_____

Company:_____

Address:_____

Postcode:_____ Telephone: ( )_____ Fax: ( )_____

Send to: Wyse Technology Pty. Limited. Macquarie View Park Estate, Unit 7, 112-118 Talavera Road, North Ryde, N.S.W. 2133. Tel: (02) 888 7455, Fax: (02) 888 7715.

WYSE

We make it better, or we just don't make it.

212/0406/0605

WYS 7343/APC

on .PCX or .TIF containing any bit depth.

The presentation component is the least intuitive of the three. Using a step that builds batch files, Applause II creates a series of .GX2 files and lets you specify transitional effects. There is no run-time version of the screen show.

A slew of device drivers and easy installation make this a full-blooded program. Overall, Applause II takes DOS-based presentation graphics one step further.

Robin Raskin

At a glance

Applause II

Distributor:	Ashton-Tate
Telephone:	(02) 953 9500
Price:	$775
Requires:	512K of RAM, DOS 2.1 or later (DOS 3.3 required for 3.5in disks)
In short:	Applause II combines the functionality of Ashton-Tate's two graphics lines: Draw Applause and the Master Graphics Series. However, its enhancements may not be enough for Ashton-Tate to make a bigger splash in the presentation graphics arena.

Aldus PrePrint produces four-colour separations

Colour is the last frontier for Macintosh desktop publishing. Programs like PageMaker 4.0 and Quark Express can do just about anything in layout that a graphic designer would want. However, professional colour work has, until now, remained the preserve of expensive systems like Scitex and Hell. Aldus PrePrint changes that, reducing the cost of colour separations to within the reach of modest budgets.

When Aldus released its Color Extension for PageMaker, the company promised it would ship a product called Separator to everyone who purchased the Extension. Now the company has changed its mind. Separator has changed into PrePrint and while it will still be available to users of the Color Extension at a minimal cost, it will also be sold separately.

APC took a look at a beta version of Aldus PrePrint, a simple program that looks after all the complexities in creating a colour separation.

It takes a file from the PageMaker Color Extension and creates process colour separations that can be printed on film on either a PostScript-language typesetter like a Linotronic, or on a PostScript laser printer as a composite image. It can handle either TIFF or Encapsulated PostScript images, and Aldus plans to add support for PICT images. It can also be used to modify the images by adjusting the contrast, or sharpening or softening the light, but it doesn't have any drawing or painting features.

The program has only four options in the main menu. Although there are the usual file options that let you open, print and save files, a couple of unusual but useful options in the file menu are included. As in PageMaker, there is a revert option which lets you go back to the last version of the image you saved to disk.

The other useful feature is the Image Info option, which gives you the size of the image in pixels, a space for comments on the file type and the location of the file.

At the other end of the main menu is the Windows option. This gives you four choices for the size the image is displayed on the screen — 1/1, 1/2, 1/4, 1/8. It also controls which window is in the foreground.

The other two options on the main menu are for modifying an image. Edit has undo, cut, copy and paste for changing the picture directly. Optimise display and dither modify the look of the image. The last option in this menu is preferences. You can choose the units of measurement — inches, millimetres or picas. You can turn the registration marks off and on.

The Image menu will appeal to graphic designers. It can change the look of an image in various ways: you can soften or sharpen, increase or decrease the contrast; and lighten or darken an image.

There is an auto enhance and a straight enhance, which lets you modify the highlights, midtones or shadows in the image. The final option in the Image menu is colour, which allows you to modify the saturation and balance of the colours.

If you have used one of the black-and-white image manipulation programs like Digital Darkroom, you may be disappointed in some of the Image options. PrePrint doesn't allow you to set levels for any of these modification levels.

Jeremy Horey

At a glance

Aldus PrePrint

Distributor:	InfoMagic
Telephone:	(02) 975 1044
Price:	Not available at the time *APC* went to press
Requires:	Macintosh with colour monitor and hard disk
In short:	If you use a Mac for desktop publishing and want to include colour, PrePrint gives you more control over the finished product and also cuts your costs.

"Hold on, that's not a program error, it's just a booger on the screen."

TECO ▲ MONITORS

Think Teco for Unbeatable Design, Quality and Value...

TECO - THE INTELLIGENT CHOICE IN MONITORS FOR ANY APPLICATION

- TECO is Australia's leading supplier of monitors.
- Affordable monitor technology, with nationwide service and DIRECT MANUFACTURER SUPPORT
- Superior monitors for all your needs: spreadsheets, word processing, desktop publishing and graphics.
- Vivid screen display, designed to minimise static, glare and provide a safe user-friendly environment.
- WIDE RANGE OF MONITORS:
  - 14" Dual scan monochrome (amber, green and paper white)
  - EGA colour.
  - 14" VGA paper white
  - VGA colour
  - Multiscan colour
  - High resolution, large screen monitors

TECO®

TECO Australia Pty. Ltd. 335-337 Woodpark Road, Smithfield, N.S.W. 2164
TEL (02) 725 1233 FAX (02) 604 9330
Melbourne TEL (03) 762 9177 FAX (03) 762 9097
Auckland TEL (09) 525 3640 FAX (09) 525 3386
Wellington TEL (04) 69 2868 FAX (04) 69 2873

Call your specialist TECO dealer for a demonstration and further information

WORKING TO YOUR ADVANTAGE

FOXY 0491

Use the Brains IBM Gave You!

When the PC was new, big programs rarely used even 64K. So IBM® seemed quite generous when it gave us 640K of user memory.

That was eight years ago. Today, users are struggling to accommodate network and mouse drivers, TSRs and buffers within that same 640K along with the new generation of more powerful programs. It's known as 'RAM cram.'

If this is a problem you're facing (or expect to face) we have good news for you.

Introducing Manifest™ the Quarterdeck memory analyser

Even expert PC users may be unaware how much of the capacity in most PCs is wasted.

That's why Quarterdeck Office Systems, publishers of DESQview,™ developed Manifest, a new, inexpensive tool to assess memory use. It's the result of years of in-depth study of the memory map of the PC. It does for memory what PC Tools does for disks. All for very little money.

Manifest shows you things you might not otherwise know about your PC.

Manifest gives you a guided tour 'under the hood' of your PC, to show what's going on, what type and amount of memory is available, and even which portions of RAM are faster.

Then it suggests how you might load networks, buffers, mouse drivers, TSRs and other utilities into unused memory.

It finds and displays all the contents of your AUTOEXEC .BAT and CONFIG.SYS FILES, which can be a big help in diagnosing problems.

Manifest even tests memory board speed so you can make informed buying decisions.

Best of all, you don't need a PhD to understand what you're doing. Manifest's interactive operation tells you how to use the program and what benefits you can expect.

Your memory is full of holes. We can fill them. And give your programs more room to run smoothly.

Introducing QRAM™ the Quarterdeck memory optimiser

If you have an EMS 4.0 or EEMS board, QRAM (pronounced cram) can use it to free up more memory within the 0K to 640K area. Gain the additional 30-130K you need for those big programs and files. It looks at your AUTOEXEC.BAT and CONFIG.SYS files and figures out which TSRs, network and mouse drivers and DOS resources can be moved out of program memory.

And if you have an EGA or VGA-equipped PC and don't need graphics at the moment, QRAM will make an additional 96K of memory available! When you need graphics again, QRAM will switch you back to graphics mode! Think how helpful that will be for those big dBASE files.

QRAM can't work miracles, but if there's memory available anywhere, QRAM lets you use it to boost your PCs performance.

QRAM is available bundled with Manifest for just a few pounds more than Manifest alone.

Manifest and QRAM—two more examples of Quarterdeck's commitment to giving you the most productivity out of the PC and software you own today.

Introducing two new Quarterdeck Expanded Memory Managers™

QEMM 50/60 and QEMM-386

QEMM is the all-in-one memory manager for breaking the 640K barrier.

QEMM 50/60 is for the PS/2™ series 50 and 60. It works with all IBM-compatible memory boards, and comes with a long list of adapter data to help use your MCA hardware better.

QEMM-386 is for all 386-based computers, including older PCs with 80386 upgrade boards. It allows you to expand your RAM capacity—all the way to 32 megabytes, if you like.

Both give you expanded memory compatible with EMS 4.0 and EEMS. Both are also extended memory managers, compatible with XMS.

And both give you maximum control over your memory in the 640K-1024K area, guiding you through decisions on where to move TSRs and network drivers for maximum performance.

Manifest, QRAM, QEMM, and DESQview, our multitasking windowing environment—they're all designed to help you get the most from the software and PC you have today.

System Requirements

Manifest: 8088, 8086, 80286 80386 and i486 PCs & PS/2s

QRAM: 8088, 8086, 80286 PCs. Use of high memory is only available when PC has EMS 4 or EEMS expanded memory or Chips & Technologies shadow RAM.

QEMM 50/60: 80286-based PS/2s and compatibles with IBM PS/2 80286 Memory Expansion Option, IBM PS/2 80286 Expanded Memory Adapter/A or compatible.

QEMM-386: 80386-based PCs and PS/2s and PCs with 80386 add-in boards.

Trademarks: IBM, PS/2: IBM Corporation; PC Tools: Central Point Software; dBASE: Ashton Tate; 80386: Intel Corporation; Chips & Technologies: Chips & Technologies Corporation

© 1989, Quarterdeck Office Systems

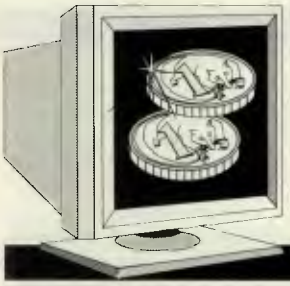
Quarterdeck

Santa Monica, California, USA

Available from:

Sourceware, Unit 1, 6-8 George Place, Artamon NSW 2064 Tel: (61) (02) 427-7999 Fax: (61) (02) 427-7642

Campbell Systems Ltd., Level 10, Marac House, 105 The Terrace, P.O. Box 10-578, Wellington Tel: (4) 499-1567 Fax: (4) 712-100



Predicting the hottest product in the next decade	Page 49
Developing effective information systems architectures	Page 50
The copy protection nightmare — how we can stop it	Page 52
Over a million users migrating from Windows to DESQview	Page 54

TWO BITS WORTH

People in this business are always looking for the next hot software product: project managers, network E-mail, outliners and so on. I want to go the other way for a minute: let's take a stab at the next hot hardware product.

My bet: scanners.

No, I don't think we'll have one sitting next to every PC. I said hot, not ubiquitous, but very, very hot over the next decade, until they become nearly commonplace, nearly as unremarkable — OK, nearly as ubiquitous — as modems are today.

In part, that's because I'm convinced business documents are increasingly going to include graphics components. I'm not talking about do-it-yourself letterheads with scanned-in logos, or letters to mum decorated with pictures of little bunnies.

Rather, I think we're going to see a lot more business people folding photos, sketches, diagrams, maps and so on, into correspondence and reports. That's going to be a major part of the transition to the complex, multi-dimensional 'smart document' many of us have been talking about for years. Voice annotation will be a part of the smart-document universe, too, but that will come later. For now, just let me stick a picture and a drawing in, thanks.

Which is just what the new generation of word processing programs are doing. Not only the heavyweight text-plus-graphics champ, Microsoft Word for Windows, and its challengers from the Ami camp, but also WordPerfect, MultiMate, Microsoft Word 5.0, and many more leading WP packages already make it fairly easy to fold a graphics image into the text of a report or proposal.

Most of the advertising for these products seems to assume that we'll sit around creating nice CAD-system sketches on our computers, or whizzy artwork from PC Paintbrush, Corel Draw! or another graphics program, to fold into these documents.

Maybe, but I doubt it.

I think most of us will still draw diagrams on the backs of envelopes, rip ads out of airline magazines, clip cartoons from the morning paper — and then want some easy way to stick all these diverse things into our documents.

Scanned TIFF (and sometimes .EPS) files are so easy to drop into documents created with the kind of word processors most of us use today that once you try it, you get hooked.

At the high end, there are much more intricate answers, such as The Wang Freestyle System. But as impressive as Freestyle's expanded and annotated documents can be, they go way beyond what most of us want today — or will want for the next few years.

Hold on a second. Just let me scan this conference-room setup I drew a minute ago, and this Polaroid of the hotel for that letter about our conference in Sydney. OK, all done.

It's about that easy.

One way I'm convinced scanners won't move onto our desks is in the form of hand scanners. I've worked with virtually all of the currently available hand scanners; on the surface, all work well enough. I think that Logitech's ScanMan (PC and Mac) and ThunderWare's LightningScan (Mac only) are the best of the breed, but many of the others are OK, too.

Until you start to *use* them.

Some of the limitations are obvious. Scanning images wider than the head on a hand scanner is impossible. Don't believe those claims that it's easy to scan adjacent sections, then reassemble them on-screen: you'll go crazy.

Scanning narrower sections — logos, photos, signatures — is also an exercise in frustration: no matter how steady you think your hand is, it's going to waver just enough during the scan to produce a distorted result. Not so distorted as to be grotesque — just unusable.

Flatbed desktop scanners are the answer. I use both a Hewlett-Packard ScanJet and a Xerox/Datacopy 630. Both are superb, but HP has the critical edge: great software.

Modems, desktop laser printers and the PC itself sounded pretty futuristic not so long ago, points out Jim Seymour. Why not a combination laser printer, scanner and fax machine?

The Complete PC's desktop unit is very good, too.

I know, finding the desktop real estate for them is a problem. But the way I think scanners will sneak into desktop computing for most of us will be as part of a new three-way tool: the compact combination laser printer, scanner and fax machine.

It wouldn't cost much to put a 300 by 300dpi (dot per inch) scanner into an HP LaserJet Series IIP. And vendors are already working on controllers to let lasers in that range serve as fax machines.

A tremendous synergy exists among those three components. Fax machines, after all, are simply scanners tied to printers. Use a fax machine, any fax machine, long enough and you'll long for a plain-paper printing mechanism — like a laser printer.

Once you've combined the scanning mechanism with that laser printing engine, and the fax card controller and telephone connections, it's an obvious — and easy — leap to let users access the scanning mechanism separately.

Bingo: a convenient three-function, no-compromises peripheral — for under $2000. You could build that machine today.

Actually, you'd be happier if you waited a few months. Adobe and others are working on controllers for laser printers that let them send and receive PostScript-code faxes. For documents that originate wholly within your PC, you'll just tell the gizmo whether to print the page locally or at some distant fax machine, then send the file.

I know it all sounds pretty futuristic. But so did modems, desktop lasers and the PC itself, not so long ago. Don't bet against it.

The growing role of powerful PC-based systems in enterprise-wide information systems brings important challenges, not the least of which, notes William Zachman, is the development of appropriate IS architectures.

During the time when PCs were primarily employed as individual productivity tools or behaved as if they were unusually smart terminals (when linked with mainframe or minicomputer systems), traditional concepts of information systems were not challenged. But the increasing use of PC technology to take on traditional enterprise-wide information processing tasks, and the application of newer construction techniques like client/server computing models, are changing all that. This scenario is creating tension between established data processing models and the newer alternatives.

A common response to these challenges has been an attempt to reassert the priority of traditional data processing architectures and to bring PCs under control in the organisation. That is, in effect, to deny the need for new architectures by forcing everything into old paradigms.

It is also not a very effective response. While a few Neanderthal managers have been persuaded by equally Neanderthal data processing types to try something along those lines, only the most authoritarian can really stop individual users from doing more or less what they want to with PCs and LANs.

Nor does it make sense to try to stop them. Not only do such unenlightened responses fail to prevent users from doing what they want to do anyway, but they undermine motivation and morale and define the most enterprising employees as subversive elements.

Simply put, an organisation that does not trust its employees is unlikely to be trusted by its employees. Worse, it is certain not to get the sort of highly motivated effort from its employees necessary to create a high-performance organisation — especially one that gains maximum benefit from modern information technology.

On the other hand, turning everyone loose with whatever PCs, LANs and other equipment they desire is hardly an adequate response. While that approach might result in some very useful and creative systems, it is probably more likely to lead to unnecessary expense, repeated mistakes and incompatibilities among departmental systems.

What's more, that approach is certain not to provide a sufficient foundation for the development of true enterprise-wide systems. At best, it will result in leaving traditional data processing systems in place. At worst, it could lead to a complete breakdown in what amounts to the nervous system of the organisation.

As we work to develop new information systems architectures, therefore, we must avoid both extremes. Instead, we must balance the two, preserving the creative tension between individual initiative and enterprise-wide co-ordination. Neither position can be ignored by a truly effective organisation.

Beyond that, we must consider many factors as we develop IS architectures for the 1990s. Not only must future IS architectures allow for continued individual use of PCs as productivity tools, freely and without undue constraint, but they also must make room for bottom-up growth of more complex application systems at, for example, the workgroup or departmental level. And third, they must be able to make use of new PC-based technology without unnecessarily sacrificing prior investments in traditional mainframe and minicomputer technology.

Any approach to the development of IS architectures that fails to meet these three criteria is inadequate. Together, these criteria constitute the *minimum* requirements that an effective IS architecture schema ought to be expected to meet.

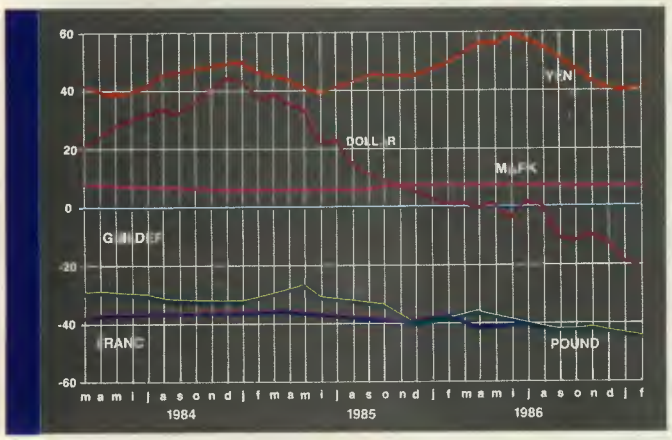
What's more, it is only when an organisation accepts these criteria that it can begin to identify some of the more promising strategies that might lead to the development of an effective IS architecture. Let's examine a few of them.

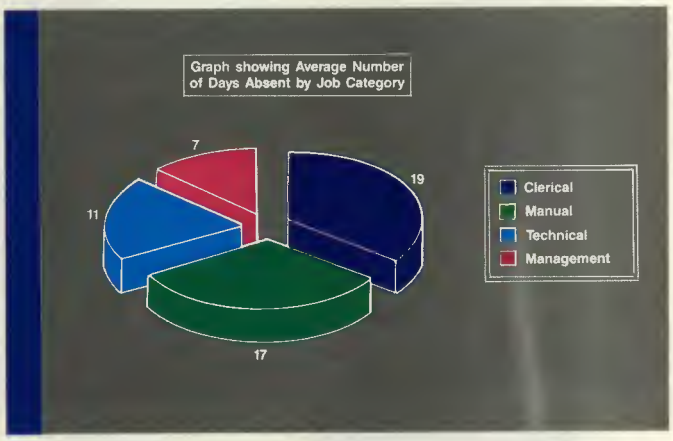
First, it is all but certain that these criteria simply cannot be met without a well-defined, yet parsimonious, use of standards and recommended practices.

For standards, while a necessary element in meeting the third criterion, can readily violate the first two if they are not used frugally and supplemented by recom-

SPSS/PC+

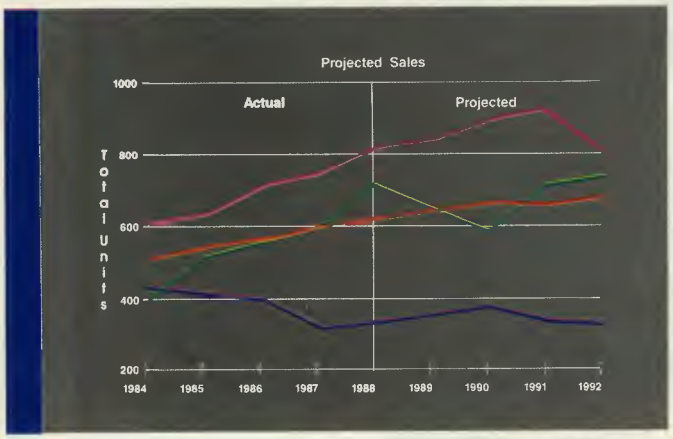
SPSS/PC+ is the top selling statistical data analysis and presentation package for MS-DOS based microcomputers. SPSS/PC+ software has been used throughout the industry for numerous applications including survey design and analysis, market research, product testing, personnel evaluation, decision support and health care analysis. To make our entire line of PC-compatible products more accessible to the first-time users of statistical analysis software, we have reduced the price considerably and made it easier to install the software.





The following SPSS/PC+ products (with local support) are now available:

SPSS/PC+ Base	*AU$1,495.*
SPSS/PC+ Advanced Statistics	*AU$ 580.*
SPSS/PC+ Tables	*AU$ 580.*
SPSS/PC+ Data Entry II	*AU$ 580.*
SPSS/PC+ Trends	*AU$ 580.*
SPSS/PC+ Categories	*AU$ 580.*



SPSS/PC+ Graphics (featuring Harvard Graphics)	*AU$ 580.*
SPSS/PC+ Mapping (featuring Ashton-Tate Map Master)	*AU$ 580.*

Also available now, a complete range of SPSS products for the Apple Macintosh (AU$1,750 for the Base and AU$680 for the Add-On modules).

For multiple copies of SPSS/PC+ software, site license agreements are available.

Hearne
Marketing Software

37 Marshall Street
Ivanhoe Victoria 3079 Australia

Telephone: (03) 497 4755
Facsimile : (03) 499 7410

SPSS
australasia

mended practices. They can all too easily become a bludgeon of conformity rather than a guarantor of connectivity and interoperability.

Required standards should be kept to the minimum necessary to provide the common basis for different systems to talk to one another. It isn't necessary, for example, that everybody in a company use the same word processing software, only that whatever WP software anybody uses be capable of creating files in formats that can be interchanged with others.

Recommended practices are a necessary supplement to required standards. Support considerations, for example, aren't an adequate reason to require that everybody use the same word processing software. A far better practice would be to recommend a particular program (or choice among several supported packages), while allowing those who prefer others to use them with the understanding that they cannot expect help from the support group.

While this example is a fairly simple one, the general principles underlying it can be applied to the full range of standards that might be adopted by an organisation.

Another promising approach to IS-architecture building can be found in the dataflow concept, in which events are triggered by the arrival of data at the processor. Every processing node has, in effect, an in-basket and knows what to do with data that appears in the in-basket.

Applied to IS architectures, this would result in systems in which each processing node works locally, based on its input and without making assumptions about the state of the other nodes in the total system beyond what is communicated directly by the data in its in-basket. In this way the enterprise-wide system is built through the interaction of a multiplicity of independently acting agents.

A third promising direction is to be found in the examination of the overall flow of information through the enterprise, and a fourth in the recognition that the real output of the information system is not information, but action.

By establishing and accepting the three criteria presented earlier, we can at least begin to find ways to develop effective IS architectures. Thus, we can avoid the throw-the-baby-out-with-the-bathwater options that simpleminded adherence to one criterion at the expense of the others leads us to embrace all to easily.

We may be about to enter a copy-protection nightmare. Now is the time to stop it, warns John Dvorak.

Piracy 1990. Paranoia returns with a vengeance. This means no backups. According to a new directive of the Council of European Communities, it will be an infringement of copyright to 'make, import, possess or deal with articles intended to facilitate the removal or circumvention of any technical means which may have been applied to protect the program'. This means that owning of copy of an article in *APC* that tells you how to change a byte in some copy-protected software would be illegal.

Such a proposal typifies the stupidity that results when bureaucrats are cornered by vested interests. The people behind this include the Software Publishing Association, the Business Software Association and Apple. They've been soliciting support for this nonsense without mentioning the fact that the law they promote does not allow for making backup copies of software for personal use. The height of stupidity was reached in Britain, where a law was passed that forbids mere discussion of copy-protection bypass!

Obviously, the copy-protection fiends want to get international laws passed so that these laws can be cited as precedents and deviously incorporated into Australian law. Ironically, publishers will be hurt most — users will simply refuse to buy their products because of copy protection.

Users do not trust disaster-prone copy-protected software. Every advance in technology is a new opportunity for it to stumble. Encumbered by copy protection, new BIOS revisions, floppy disk technology, disk optimisers, networks, caches and even DOS upgrades are opportunities for your software to stop working — forever.

Copy protection is so counter-productive to marketing efforts that I'm always shocked when a company uses it. When Paradox was introduced years ago it was clearly the best database product on the market. But its publisher shackled it with a copy-protection scheme, giving everyone the shivers.

Paradox never got off the ground, and the company had to merge with Borland. Years passed before Paradox began to fly without copy protection, but it never did achieve the success it might have if it had not been copy protected in the first place.

So why is copy protection suddenly an issue again?

It's the proliferation of portable and laptop PCs. Few users buy a second copy of expensive software to run on their laptops. Instead, they download the needed programs from their desktop machines. Software packages are licensed for one CPU. Once they've been installed on your primary machine, that's where they're supposed to stay.

There has never been a provision in any software license agreement that allows for laptop use. But since the laptop is actually an extension of the desktop (despite its separate CPU), it should be given consideration in license agreements.

What about the poor user who has more than one laptop? Software companies that expect a single user to buy two, three, maybe four copies of the same package are just plain greedy. They're living in a dream world if they expect popular support for such a notion.

Well, that is what they expect. Perhaps they should look back on Borland's visionary license agreement for SideKick that says, in essence, 'Treat this package like a book. Only one person gets to use it at a time'. So let's be fair about copy protection. It's time users protested this stupidity.

QUALITY PLUS

INCLUDES LOTUS 1·2·3·

Lotus 1.2.3. is included with every Ultra Plus Computer and we can tailor a system exactly to suit your needs. So call the Ultra Hotline, our experts are waiting to take your call. Delivery within 24 hours to most capital cities. Cash, Cheque, Bankcard, Visa.

- Rock solid 2 Year Warranty.
- National Service Network.
- All Ultra PC's are comprehensively tested for a full 24 hours.
- Three months free technical telephone support.

ULTRA PLUS XT SLIMLINE
640K RAM, 20Mb hard drive, mono display and monitor, 101 keyboard.
$1895

ULTRA PLUS AT SLIMLINE
16MHZ Motherboard, 1Mb RAM, 20Mb hard drive, EGA Display and Monitor, 2 Year Warranty. Lotus 1.2.3.
$2995

ULTRA PLUS AT
16MHZ Motherboard, 1Mb RAM, 40Mb 28ms hard drive, EGA Display and Monitor, 2 Year Warranty. Lotus 1.2.3.
$3395

CALL THE ULTRA HOTLINE NOW.

MELBOURNE: (03) 646 5155
SYDNEY: (02) 697 8525
BRISBANE: (07) 352 5766

ULTRA

THE ULTRA COMPUTER COMPANY

John Sterlicchi discusses a product that will allow DOS users to tap into Unix applications without relinquishing their favourite PC hardware and software applications.

Bill Gates, the boyish billionaire who runs Microsoft — which is just about to be overtaken as the PC world's biggest software company (see Newsprint) — has been loudly touting Windows 3.0 as we run up to its May 22 launch. I wish he wouldn't because he's confusing everyone who bothers to listen about the respective roles of Windows and OS/2.

Gates says Windows is designed for the average user with one to 2M of RAM. But Microsoft has added features to Windows 3.0 which will make it a good choice for high-end users. Microsoft seems to be saying that it sees OS/2 as a contender for server platforms which have traditionally been dominated by Unix — not as a competitor against MS-DOS or Windows . . . which is a new one on me.

Gates recently said that OS/2 is best suited for applications development, networking and distributed applications, not as an immediate successor to MS-DOS on the desktop. "We ourselves underestimated how popular Windows would get and how far we could go with it. I now believe that this year over half of these [MS-DOS] users will move to Windows," he said.

The hype surrounding Windows has become so bad that I want to say to hell with it. Well, no fewer than a million and a half DOS users have done just that and are happily multi-tasking off-the-shelf DOS and Windows applications programs with DESQview, an operating environment from Quarterdeck Office Systems. The company was founded in 1981 to develop and market software utilities designed to integrate popular applications in a multi-tasking, windowing environment. The flagship product is available in versions to run on 8088, 8086, 80286 and 80386-based PCs with 640K of RAM. Users may load and open as many programs as they want, but only programs that fit in the PC's 640K of RAM can actually run simultaneously.

A 'fast switch' feature lets users switch from program to program without rebooting. For systems with extended memory, programs can be larger than 640K and run simultaneously using expanded memory utilities available from Quarterdeck. An official from this privately-held company said current sales were "astronomical."

DESQview and its accompanying development tools have also been well accepted in corporate environments as a platform for in-house development. But facing the might of Microsoft, is Quarterdeck destined to be crumpled beneath the Microsoft juggernaut as the industry shifts definitively into multi-tasking, windowed environments?

Quarterdeck has a neat answer to that one. "Our past history tells us that DESQview sales go down just before a new Windows release appears, then sales go back up when users see how limited Windows has turned out to be," explained Quarterdeck co-founder Therese Meyers. "We haven't seen that happen this time. Our sales continue to increase . . ."

The company says there will be a need for DESQview no matter how popular Windows becomes. "Windows 3.0 beta users have told me that while the Microsoft environment is good for Windows applications, it still doesn't do a good job of multi-tasking off-the-shelf DOS applications," Meyers explained. A new version of DESQview — to be released the same day in May as Microsoft launches Windows 3.0 — will let users multi-task DOS and X Windows-based Unix applications. Code-named Starboard, this DESQview innovation will require an 80286-based PC with 2M of RAM.

It brings a distributed graphics applications programming interface to DOS, says Quarterdeck. Quarterdeck will provide a tool kit to be used to recompile Unix applications to run in the new environment, and for the development of new DESQview applications that can run on standalone PCs, or distributed over a mixed network of DOS and Unix systems. DOS users will inevitably be bumping into Unix as that once-arcane operating system invades corporate desktops. Quarterdeck appears to have come up with a clever way to let DOS users tap into powerful Unix applications without giving up their PC hardware and favourite software applications, and at the same time, follow the time-saving trend to multi-tasking in a graphical user interface environment.

EN

"First of all, I'd like to dispel the rumour that this company is being bought by a Japanese concern. Second of all, I'd like to explain the Yakitori in the lunchroom."

We don't really enjoy calling your current laptop a lazy dog, but...

...the inescapable truth is that our brilliant new Renard L300 Series computer is far quicker, because it's far more powerful, than your current lapdog – sorry, laptop.

And when it comes to leaping over whatever you've got now, we mean all the way over because the Renard L300 Series is the first and only full-power battery-powered genuine '386 laptop.

Quite simply, it's the most powerful battery portable your hard-earned money can buy. And that means they're more efficient. And that means you're more efficient.

And that's what Renard is all about.

- ☐ uses an 80386 processor operating at 20 MHz.
- ☐ 2 mega-bytes of memory (RAM).
- ☐ 40 or 120 mega-bytes of hard disk storage.

- ☐ VGA resolution liquid crystal (LCD) screen is brilliant page-white with black characters. Screen capable of displaying text and high resolution graphics.
- ☐ weighs only 6.4 kgs and is very compact.
- ☐ fully expandable to contain all normal features of deskbound units.
- ☐ battery powered.

Distributed by Veridata Australia Pty. Ltd.
Level 1, 165 Gertrude Street, Fitzroy, Victoria 3065.
Phone 417 7055. Fax 416 2106.

RENARD
Your business cunning

MELBOURNE (03) 663 6509. 525 2622. SYDNEY (02) 555 7466, 954 4649. BRISBANE (07) 252 2011, 369 6888. PERTH (09) 227 8952.
ADELAIDE (08) 234 0994. HOBART (002) 31 1189. DARWIN (089) 81 6100. AUSTRALIAN CAPITAL TERRITORY (062) 88 4555

Rosemary 1401

We insist on reliability

"First rung of the corporate ladder, and I already have my own office."

Panasonic's XT* compatible CF-150B Laptop Computer is so versatile, light and compact, your office goes anywhere you do.

Its rechargeable internal battery provides long, continuous portable operation. And for stationary use, an AC adaptor is also included.

As operating system information is contained in the internal ROM/RAM disk, there's no need to insert a system disk before starting. By adding an optional 1MB EMS RAM card, you can use a section of the RAM memory to hold applications software, or to increase processing capacity for large spreadsheet, graphics and database applications.

And this powerful PC is easy on the eyes, with a large backlit LCD display for maximum legibility. Your hands will feel at home on its standard-size keyboard, too.

The CF-150B — an office the size of a notebook.

CF-150B

*XT is a trademark of International Business Machines Corp.

Panasonic
Office Automation OA

PANASONIC AUSTRALIA SYD: (02) 887 5333 MELB: (03) 565 1400 BRIS: (07) 268 6455 ADEL: (08) 268 8622 PERTH: (09) 451 7211

PM vs Windows

Will Presentation Manager become the key platform of the future, or will Windows continue to be used by all but the power hungry? Microsoft's Daniel Petre and MicroHelp's Lloyd Borett discuss the future of both graphical environments.

Most of you will probably be familiar with Microsoft Windows. Essentially, it's Microsoft's very successful attempt to give DOS a graphical user interface. Software developers write their applications to run in the Windows environment and instead of having to implement their own screen, printer, mouse and other device drivers, they can use the drivers built into Windows.

As the software developers are using similar tools to display information and accept input, the applications themselves often have a common look and feel. Users familiar with one Windows-based application find it easy to learn a second. There are many impressive applications now available that use the Windows environment. Many of these, such as Aldus PageMaker, started life on the Apple Mac but were later ported to run on DOS-based PCs, using the Windows graphical user interface.

> '. . . Windows has to run with all of the limitations imposed on it by the underlying DOS operating system. Applications written to run using OS/2 PM will have few of these limitations.'

However, a graphical user interface also introduces system overheads. More processing needs to be done to display the information in graphical form; thus, 286-based PCs are considered the minimum platform for most Windows-based applications. Few users tolerate the performance of Windows on an 8088/8086-based PC, and many opt for the added power of 386SX, 386 and 486-based systems.

The Windows environment also adds memory overheads to the system. Given that most major software developers are now struggling to fit their applications into the 640K DOS base memory area, that can be a real problem. Couple it with the memory overheads of linking machines together on a network —

Continued on following page

The proposition is somewhat irrelevant. Windows and Presentation Manager do not compete with each other. Both are graphical environments for PCs that bring to personal computing a facility that allows users to increase productivity and make learning new applications easier.

The future lies with graphical personal computing. Anyone who doubts this need only go to a computer dealer and compare any current character-based application with a competitive graphical application. The difference is comparable to travelling on a stagecoach, or flying on the Concord.

> 'With Windows-based applications under the Windows environment, users are able to dramatically increase their productivity while finding the PC easier to use.'

Windows sits on top of MS-DOS. With Windows 3.0 users will be able to manipulate directories, set up printers, change the look of the screens and review file data all with the use of graphical icons and pull-down menus. The C> prompt is finally dead. Users no longer have to become Egyptian hieroglyphic experts to simply copy or move files between directories and disks.

While there are many benefits for users of character-based applications under Windows (eg, Lotus 1-2-3 and Word 5) the list of benefits grows expediently when the user migrates to Windows applications such as Excel, Word for Windows, Ami and others. With Windows-based applications under the Windows environment, users are able to dramatically increase their productivity while finding the PC easier to use.

There is no logical position that could oppose the concept that within three years all PCs will utilise Windows-based (read Presentation Manager) environments as standard. Presentation Manager is the graphical interface for OS/2, and supports the full definition of

Continued on following page

which is a typical requirement in today's business environment — and the problem can become unworkable.

The OS/2 operating system was designed to solve just this problem, and at the same time give us real multi-tasking capabilities rather than kludges to make DOS seem to be multi-tasking. A key part of OS/2's development has been the Presentation Manager graphical user interface.

With the introduction of Windows 3.0, you will see the Windows graphical user interface begin to look similar to the OS/2 1.2 Presentation Manager interface. Therefore, there is no point comparing Windows and Presentation Manager. What needs to be compared is the nature of the operating system that each runs with. The fact is that Windows has to run with all of the limitations imposed on it by the underlying DOS operating system. Applications written to run using OS/2 Presentation Manager will have few of these limitations.

When listening to project leaders controlling the development of OS/2 Presentation Manager-based applications, one often learns that their biggest problem is deciding what new features they will have to leave out in the next release in order to get the product out into the marketplace in a timely fashion. There is so much room to implement features, it becomes overwhelming.

That's a far cry from those working on applications running under DOS. Their biggest problem is how to

Continued on following page . . .

IBM's CUA part of SAA. It is a superset of the features and facilities of Windows 3.0. Users familiar with Windows 3.0 will be able to migrate without any training to Presentation Manager.

The selection, however, of whether one should purchase Windows or Presentation Manager will never be one that requires answering. The selection is based on the type of PC being purchased and, more fundamentally, the applications that will be run on the PC.

If the user is in the process of developing high-level systems that require multi-tasking and multi-user networks, where advanced security, fault tolerance, distributed databases, performance and other 'mainframe' like facilities are required, then the operating system for the PC must be OS/2. Further, the PC should be a 386 with at least 4M of memory.

If the user is looking for a standalone application but still requires multi-tasking, the operating system must also be OS/2. The extra cost for the PC is more than balanced with the increase in workload that can be processed.

When selecting OS/2, the user will automatically receive Presentation Manager. All applications written for OS/2 utilise Presentation Manager. If the user does not need those, they will find their needs addressed with Windows-based applications running on top of Windows and MS-DOS.

The style of PC effectively

Continued on following page . . .

Top Savings to Carry Away

TOSHIBA SPECIALS

T1000 Single Floppy.....$1344.00
T1000-SE Single Floppy....$1989.00
T1000-XE 20-MB.....$3196.00
T1200-FB Twin Floppy.....$2370.00
T1200-HB 20-MB B/L..... $3246.00
T1200-XE 20-MB S/L.....$4391.00
T1600 20-MB..... $5065.00
T1600 40-MB.....$5739.00
T3100 40.....$5115.00
T3100-SX 40-MB.....$6172.00
T3200 40-MB.....$5550.00
T3200-SX 40-MB.....$6665.00
T5100 100-MB.....$7909.00
T5200 40-MB.....$7909.00
T5200 100-MB.....$9257.00

EXTN 5.25" Floppy Drives
Carry bag (Nylon)
Carry bag (Leather)
Internal Modems
All other accessories available. (P.O.A).

CPEC Computers
739 - 741 Centre Rd, East Bentleigh. 3165
Tel: (03) 579 2211 Fax: (03) 5790520

Boldline M Series

Easier to Update Than a BMW M3 Series.

The new Wearnes Boldline M Series, by their revolutionary design, allow you to up-grade your computer from286 standard to 386SX or i486 in seconds. This is achieved by the innovative design skill of the computer industry's leading award winining design team from ALR. By the use of an up-gradable motherboard, we can offer a computer that can be simply and cheaply up-graded as and when YOU need to.

It features 1MB of zero wait state memory, as well as a 40MB hard disk, plus the flexibility of SIX expansion slots. And while many computers are also IBM compatible, they don't combine the technological excellence of Wearnes, with the design power of ALR.

Now that you have found the Wearnes Boldline M Series, your search for a better personal computer for less is over for a long, long time.

To test drive the new M Series call into CPEC Computers or phone on (03) 579 2211 for more information.

Wearnes
BOLDLINE M SERIES
Designed by ALR

CPEC Computers

Ph (03) 579 2211 Fax (03) 579 0520
739 - 741 Centre Road EAST BENTLEIGH 3165

SOFT WARE

Wearnes Boldline M Series is also sold under the brand name Powerflex and Flexstar worldwide. BMW, IBM, 386SX, i486 and ALR are the registered trademarks of the respective companies.

make the code they must have, actually fit. So great is the problem that we've seen most of the leading software developers miss critical deadlines with recent product upgrades and new releases.

Applications running under OS/2 Presentation Manager run faster than the same applications running under DOS-based Windows. Just compare the performance of OS/2 Presentation Manager-based Excel with the Windows version of Excel.

When the new OS/2 1.2 High Performance File System is used in place of the old DOS FAT file system, we will see further increases of between 30 and 400 per cent on disk access speeds alone! When the version of OS/2 tailored to make use of the additional power of the 386 and 486-based PCs ships next year, the performance difference will become even greater.

Not everybody requires their PC to be connected to other PCs, and to have extremely powerful software solutions. Their work is such that it's not justified given the benefits they can expect. For them, Windows will deliver the added benefits of a graphical user interface. But an ever increasing number of people are finding the limitations of DOS far too restrictive. As the OS/2 versions of the programs they use become available, they will switch from DOS to OS/2 and never look back.

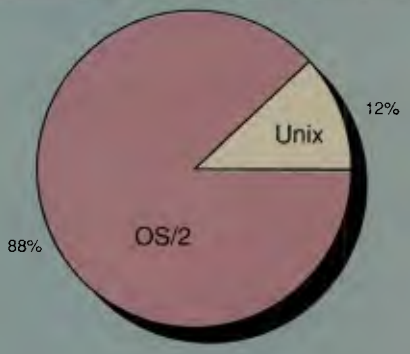
Is Presentation Manager better than Windows? Of course it is. But for the end-user it's not because of any great differences in the way the graphical user interface looks to them. It's the nature of the underlying operating systems that make the difference.

At Comdex last year IBM and Microsoft, in a joint announcement, indicated that the majority of their application and systems development resources will be applied to OS/2 solutions. They plan to make their graphical applications available first on OS/2. The companies that created Windows and OS/2 Presentation Manager have already made their choice.

In summary, OS/2 Presentation Manager is the strategic choice for the future. Windows is the short-term tactical option to get IBM standard computing users to accept a graphical user interface. OS/2 Presentation Manager is the right choice for the '90s.

Lloyd Borrett
Marketing Specialist
MicroHelp

Readers' poll results: OS/2 vs Unix



In the April issue, we asked readers which operating system they believed would lead us through the Nineties, OS/2 or Unix. As you can see, the overwhelming majority of callers sided with Bill Bolton's argument that Unix has had the entire life of the PC industry to make a hit on the desktop, but has not, and will not, cut the ice.

running Windows-based applications would be one PC utilising a 286 processor (or above) with 640K of memory (or above).

If I have a 386 and I want to run a graphical word processor, what should I do? Buy Windows and Word for Windows (or a similar product). You can then upgrade to OS/2 if your requirements grow. Many uses will remain with Windows for a long time (years!) as they will never need any more power than that offered by Windows.

A review of the PC market today would show that approximately eight to 10 per cent of users have needs that can only be addressed with OS/2-based applications. Primarily, these are corporate users where advanced operating system features are mandatory or where multi-tasking performance is critical.

Of the remaining users (90 per cent plus), all would notice significant benefits in utilising Windows as an environment. Further, these users would witness even greater levels of productivity and ease of use with Windows-based applications under the Windows environment. The limiting factor will be the type of PC that is used. If it is based on a 286 processor or above, then Windows is there to be utilised.

Graphical computing is a difficult environment to describe. Users can best evaluate whether Windows or Presentation Manager can provide any benefit for them by seeing it.

It is worth highlighting that a user can have a network of PCs where some are running Windows applications and others running OS/2 Presentation Manager-based applications. The people sitting at the workstations are not aware of the particular environment they are using — and nor should they. Further, users can move between workstations (ie, go from a Windows PC to an OS/2 Presentation Manager PC) with no training. This is the way PCs should always have been.

In summary, it is not, nor will be, a case of Windows versus Presentation Manager. One is a subset of the other. They are complementary products that together provide the basis of graphical computing, which is the future (and present) of personal computing.

Daniel Petre
Managing Director
Microsoft

Readers' poll

Which graphical user interface do you believe will dominate through the Nineties: Windows or Presentation Manager? We'd like to know your feelings on the subject. Phone our toll-free number (008) 032 390 for your vote. The line will be running until Friday, May 18, and we'll publish the results in next month's issue.

IMAGE SYSTEMS

15 Stud Road, Bayswater, Victoria 3153. Telephone (03) 720 2444. Fax (03) 720 2325.

A reflection of today's computing needs

PC XT System
10 Mhz TURBO

Features:
- 640 Kb RAM
- 20 Mb Hard Disk Drive
- 360 Kb Floppy Drive
- EGA Colour Monitor
- Enhanced 101 key Keyboard
- 2 Serial, 1 Parallel and Games Ports
- BMC Mouse
- DR DOS 3.4 (inc. GEM DESKTOP) (MS DOS 3.3 optional)

12 Months Warranty

$2,599

PC AT 286 System
16 Mhz Zero Wait State

Features:
- Neat Chip Set
- Landmark Speed 20 Mhz
- 1 Mb RAM
- Supports EMS V4.0
- 40 Mb Hard Disk Drive
- 1.2 Mb Floppy Drive
- EGA Colour Monitor
- Enhanced 101 key Keyboard
- 2 Serial, 1 Parallel and Games Ports
- BMC Mouse
- DR DOS 3.4 (inc. GEM DESKTOP) (MS DOS 3.3 optional)

12 Months Warranty

$3,599

PC AT 386 System
20 Mhz Zero Wait State

Features:
- Landmark Speed 25.9 Mhz
- 2 Mb RAM expandable to 8 Mb
- Supports EMS V4.0
- 84 Mb 19ms Hard Disk Drive (1:1 Interleave)
- 1.2 Mb 5.25" Floppy Drive
- 1.44 Mb 3.5" Floppy Drive
- Paradise VGA+16 bit Graphics
- VGA Multiscan Colour Monitor
- Enhanced 101 key Keyboard
- BMC Mouse
- DR DOS 3.4 (inc. GEM DESKTOP) (MS DOS 3.3 optional)
- Optional Wangtek Tape Backup

12 Months Warranty

$6,695

OUR GUARANTEE TO YOU

All components are sourced from authorised Australian distributors and are supported locally by full manufacturers warranties.

Model	Speed	Memory	Floppy Drives	Hard Drives	Mono	Color	EGA	VGA
XTB	4/10 Mhz	640 K	2 x 360 Kb	n/a	$1599	$1799	$2199	$2399
XTH20	4/10 Mhz	640 Kb	1 x 360 Kb	20 Mb IDE	$1999	$2222	$2666	$2888
XTH40	4/10 Mhz	640 Kb	1 x 360 Kb	40 Mb IDE	$2199	$2399	$2799	$2999
ATH20	8/16 Mhz	1 Mb	1 x 1.2 Mb	20 Mb IDE	$2884	$3139	$3549	$3774
ATH40	8/16 Mhz	1 Mb	1 x 1.2 Mb	40 Mb IDE	$3034	$3289	$3699	$3924
AT40Q	8/16 Mhz	1 Mb	1 x 1.2 Mb	40 Mb Quantum*	$3134	$3389	$3799	$4099
AT80Q	8/16 Mhz	1 Mb	1 x 1.2 Mb	80 Mb Quantum*	$3589	$3789	$4199	$4399
38640Q	20 Mhz	2 Mb	1 x 1.2 Mb 1 x 1.44	40 Mb Quantum*	—	—	—	$5995
38680Q	20 Mhz	2 Mb	1 x 1.2 Mb 1 x 1.44	80 Mb Quantum*	—	—	—	$6795

Please call for your personalised configuration.
*Average access time 19ms.

THIS IS HOW TO ORDER:

CALL NOW!

ORDER HOTLINE **008 334 095**

ENQUIRIES: **(03) 720 2444**

FAX: **(03) 720 2325**

- All prices include State Sales Tax and may be subject to change without notice.
- Delivery charge $10.
- Overnight delivery wherever possible.

E. & O.E.

MasterCard VISA

This is your chance to air your views — send your letters to *APC*, 122 Ormond Road, Elwood 3184; or contact us via APC MAGNET on Telecom's Discovery 80.

Pricing down the line

Your article on Grey Marketing (*APC* March) as presented by Daniel Petre of Microsoft, fails to address the need for software support, nor does it truly justify the exorbitant prices for software and hardware.

If the software and manuals are well written, then there is little need for support. If users still feel a need for support, let them pay for it. I have had this option given to me before for software that I have purchased. The choice then becomes mine, not the distributor's.

What support is required for a coprocessor? What is available? Why the disparity in prices between the US and Australia?

Daniel Petre cites one reason as 'economies of scale', that his products are made in Redmond WA, US. I cannot believe that they make a special batch of software for Australia or any other English-speaking country. They are not inept.

So why the price difference? Flight Simulator 4.0 can be purchased for less than $US39 in the US, but we pay $89 in Australia. Import Duty would be a very hollow reason. The amount payable on software is related only to the media, and is 23 per cent. On even the most disk-intensive program this would cost less than $1.

I have purchased software both in the US and in Australia, and the price difference is keeping a lot of sales out of the country. I challenge distributors to provide support at cost, lower their margins and make some volume sales — and maybe even help reduce piracy.

If the market is worth $10 billion, now how much more would it be if software/hardware were priced more realistically?

Wayne Munch

. . . and you call that service?

I found the article on Grey Marketing (*APC* March) rather ironic in view of my experience with Microsoft and the 'support service' it offers.

On July 28, 1989, I purchased QuickBasic 4.5, but found that the books supplied were marked version 4.0. Thinking that the books were probably correct for version 4.5, I started working through them, but soon came to a problem where the Window. displayed was different from the books, and the problem became worse as I persevered.

I wrote to Microsoft Australia on July 31, explaining the problem and asking for the correct books. When no reply had been received by August 28, I wrote to Microsoft in the US, again explaining the problem, and described the anomaly in the books and the lack of service. On September 11, I received a letter from Microsoft Australia in reply to my letter to the US, offering to exchange the manuals and asking for an address (other than my PO Box). I replied on the following day, offering two alternatives to make the exchange.

When I had not received a reply to this letter by September 29, I forwarded the books and a further letter, both by certified mail, saying that I expected the correct books within 10 days. On October 3, I received a letter from Microsoft, saying that the correct manuals would be dispatched on that day 'to avoid delays' and requested that I return the first three pages of each manual.

However, I did not receive the correct books until October 23. The exercise had cost me an extra $22 and I had just two days left to check out the disks before the end of the warranty period!

Unfortunately, this is not the end of the saga. I started working through the correct books and came up against the same problem. After a few hours of trying and retrying (again faithfully following the book), I started opening the books at random and eventually found the solution long past the point that I had reached. I had, as suggested, opened with a reduced menu, but the display illustrated in the manual required a 'full menu'. I had explained the problem in my first letter to Microsoft Australia and my letter to Microsoft US — but in both cases this had been ignored.

This is 'product support'? It cost me $22 above the full retail price, plus a lot of time, to find that the only things supported are 'representatives' out here for a holiday.

Lawrie Debnam

END

★ Announcing ★

THE BORLAND B.A.D. GUY'S

Borland Pacific is pleased to formerly announce Australia's B.A.D. guys.

The B.A.D. Guys (Borland Accredited Dealers) are some os Australia's leading software resellers who have been selected in recognition of their ability to provide the highest level of service and support for Borland products to guarantee the best possible distribution channels are created for the Borland range of products.

National Distributor	Phone
Kenfil Distribution Australia Pty Ltd	
NSW	02) 361 0960
VIC	03) 523 0800
WA	09) 367 8277
State Distributors	**Phone**
VIC Microway Software	03) 555 4544
QLD Techsource P/L	07) 832 4883
SA Lodin Computer Supplies	08) 332 5077
Solution Centres	**Phone**
NSW Pollak Partners P/L	02) 262 3777
NSW BMS T/as ConsulTrain	02) 923 2500

NSW	Phone
ABC Computers	02) 552 3088
Protech Microsystems	02) 957 4346
Thinking Systems	02) 560 0666
PC Direct	02) 439 1000
Ferntree Computer Systems	02) 221 4477
Natcomp Technology Australia (NSW)	02) 555 7466
Micro Sales	02) 281 3377
Microhelp Computers	02) 693 2544
Microcorp P/L	049) 61 1090
The Computer Trader	02) 318 2522
Lodin Computer Supplies	02) 439 3866

VIC	Phone
Protech Microsystems	03) 690 6600
Ferntree Computer Systems	03) 541 5600
Software Express	03) 663 6580
The Computer Trader	03) 417 7044
Microhelp Computers	03) 388 0111
The Computer Shark	03) 241 9111
Micro Sales	03) 525 4566

QLD	Phone
Technology Wholesalers	07) 357 5644
Ferntree Computer Systems	07) 236 1114
Sunrise Computer Systems	07) 368 3338

ACT	Phone
Specialised Technology Group	06) 243 5137
Ferntree Computer Systems	06) 248 8488
The Computer Trader	06) 241 8922

SA	Phone
Protech Microsystems	08) 231 4066
Ferntree Computer Systems	08) 268 1933
Programs Plus	08) 326 1900

WA	Phone
Ferntree Computer Systems	09) 322 2730

TAS	Phone
Albatross Computers P/L	002) 310 119

BORLAND
PACIFIC

Level 2. 15 Orion Road. Lane Cove 2066
Ph: (02) 418-7330
Fax: (02) 418-7307

LOTUS USERS
UPGRADE TO QUATTRO PRO

BORLAND'S NEW SPREADSHEET

THE BALANCE OF POWER: QUATTRO® PRO

	QUATTRO PRO®	Lotus 1-2-3® v 2.2	Lotus 1-2-3® v 3.0
PUBLISHING			
3-D Graphs	✓		
Built-in draw package	✓		
Individual cell font control	✓	✓	
Shading and borders	✓	✓	
Print graphs & spreadsheets side-by-side	✓	✓	
CONSOLIDATION			
Multiple spreadsheet windows	✓		✓
Multipage consolidation	✓		✓
Keyboard and mouse support	✓		
Lotus 1-2-3 v 2.01 compatibility	✓	✓	✓
Spreadsheet Capacity (NSTL) ** 640K RAM	11	8	NA
Spreadsheet Capacity (NSTL) ** 1Mb RAM	18	12	5

QUATTRO PRO does it all today.
Publishing. Consolidating. Presenting.

QUATTRO PRO, with a unique balance of power, does *both* advanced publishing *and* multipage consolidation. Lotus 1-2-3's Release 2.2 cannot do both. Neither can their Release 3.0 (see comparison chart).

QUATTRO PRO is compatible with 1-2-3.® It comes with a built-in draw package, clip art library,* and Bitstream® typefaces for presentation-quality output.

SPECIAL OFFER
Lotus Users Upgrade to Quattro Pro For
$260.00
until JUNE 30, 1990.
Fill in coupon below.

OR
Upgrade through any Borland Accredited Dealer
See listing opposite

☐ Please send me more information on Quattro Pro
☐ Please upgrade my Lotus, serial # _____
☐ Cheque enclosed $ _____ for _____ copies.

Name: _____ Title: _____
Company: _____
Address: _____
_____ Postcode: _____

BORLAND
P.O. Box 264, Lane Cove NSW 2066
Phone: (02) 418 7330 Fax: (02) 418 7307

BORLAND

Oversea-ing Productivity

FASTBACK PLUS
THE BROOKLYN BRIDGE
DISKLOCK
MACE UTILITIES
FASTBACK II
THE LOGICAL CONNECTION
PYRO!
SUITCASE II
FASTBACK TAPE

Distributed by
Dice Engineering
61-3-739-5455

Fifth Generation Systems, a leading computer software manufacturer in the United States, is proud to introduce to the European market its best selling line of data protection and utility software, including ***FastBack Plus*** and ***FastBack II***, the world's fastest and most reliable backup software for the IBM/PC, PS/2 and compatibles, and the Macintosh.

Ever since we created the first backup software for the PC in 1985, we've been on the leading edge of technology with outstanding utility products - providing *more* power, *more* performance, and *more* versatility in utility tools. Our line of products provides maximum data efficiency and security in order to help you do more in less time - **maximizing productivity.**

America's first family of utilities is also providing up-to-date service, increased sales representatives and technical support for such inspired, innovative products as ***Suitcase II***, ***DiskLock***, ***The Logical Connection***, and ***Mace Utilities*** world-wide - *with the same pledge for service that we've become so famous for in America and now commit to the European market.*

We're commited to solid business relationships with our new customers and look forward to getting to know you.

Efficiency. Security. Productivity.
America's first family has finally arrived in Europe.

FIFTH GENERATION SYSTEMS
10049 N. Reiger Road Baton Rouge, LA, USA 70809 (504) 291-7221

Spreadsheet heavyweights take on 1-2-3

Time was, not long ago, when IBM so dominated the PC marketplace that rumours of an imminent new product could put everybody's plans on hold. Purchasing managers tabled purchasing decisions, and companies designing competing products either rushed to beat IBM out the door or, more likely, waited to see what the giant was going to do before freezing their own designs.

IBM's hegemony may be history, but in the spreadsheet market one company still has that kind of power: Lotus Development. Over the past few years, a single event — the arrival of 1-2-3, Release 3 — stands out in relief from all others in the spreadsheet area. Though it was announced in April 1987 with hopes for delivery in early 1988, Release 3 didn't actually ship until June 1989. When it finally did arrive, however, it revealed the future course of spreadsheet software as envisioned by Lotus. And, with something like eight million users still at the giant's feet, no-one could afford to ignore that.

Separate and unequal

The future, says Lotus, lies along two divergent tracks: one for users with advanced hardware, the other for users with first-generation PCs. On those blessed with 286 or 386 PCs and at least 1M of extended memory, Lotus bestowed a 3-D spreadsheet with built-in network support and the ability to access external database files.

As a consolation prize to the masses who don't make the hardware cut, the company offered 1-2-3, Release 2.2, a face-lifted version of its best-selling Release 2.01 that runs in 320K of RAM. And just released (see *APC* April) is an even fancier version, 1-2-3/G for OS/2 Presentation Manager, which will support the graphical user interface while remaining keystroke-compatible with Lotus's character-based products (see the text box 'Two spreadsheets for OS/2').

Yet not all vendors have bought into Lotus's vision of the market, and 1989 saw the emergence of plenty of alternatives from which to choose. Most notable of these is Quattro Pro from Borland International, a much-enhanced version of Quattro that incorporates some of the advanced technology from Surpass, which Borland purchased in September 1988. Quattro Pro offers most of the consolidation capabilities of its rival in a superlative windowing interface and boasts far superior worksheet publishing features, yet runs just fine in 512K of RAM.

1989 also saw Computer Associates and WordPerfect weighing in with new versions of SuperCalc and PlanPerfect, respectively, both running under the 640K barrier. And in early 1990, Paperback Software International began to ship VP Planner 3D, a three-dimensional upgrade of VP Planner Plus that matches 1-2-3, Release 3, in features and power while running in as little as 384K of RAM.

New functions, new capabilities

The heated competition among vendors for a share of the huge spreadsheet market has pushed spreadsheet technology to new heights. The programs we review here, including both flavours of Lotus 1-2-3, Lucid 3-D, Microsoft Excel, PlanPerfect, Quattro Pro, SuperCalc5 and the spreadsheets in the integrated packages Enable, Framework III and SmartWare II, have features that place them in

a generation beyond the old standard, 1-2-3, Release 2.01. Here are some trends and capabilities to keep in mind as you browse the new spreadsheet marketplace:

• **File linking** The days of consolidating spreadsheets laboriously 'by hand' using the /File Combine command or its equivalent are over. All of the programs reviewed in this issue have the ability to link cells in different spreadsheet files, allowing changes in supporting worksheets to be reflected more or less automatically in a master consolidation worksheet. Most also allow you to keep more than one file in memory at once so that you can see the supporting worksheets as you work with the consolidation model. They differ significantly, however, in their implementation of file linking: in the ways that consolidation formulas are updated and in the intelligence with which the programs respond to structural changes in the linked worksheets.

File-linking offers benefits beyond consolidation. The ability to connect worksheets makes it possible to work in smaller modules, reducing the need for huge, memory-eating worksheets. By making it easy to separate raw input values from formulas and reports, it encourages good modelling form, helps ensure data integrity and reduces duplicated effort. And it lets you create worksheet-independent macro libraries that can be shared and reused with many different worksheets.

Most of the programs reviewed here allow macros to reside either in the current worksheet, in the manner of 1-2-3, Release 2.01, or in a separate macro library.

• **Three dimensionality** Besides file linking, 1-2-3, Release 3 also offers 3-D worksheets that let you create multiple 'pages' in a single worksheet file and to define ranges that span two or more pages.

Since some programs that do not offer 3-D let you save groups of separate worksheets in 'workspaces', the distinction between file linking and three-dimensionality is easy to overlook. Indeed, the computer press and some of the vendors (like DacEasy, for example, whose Lucid 3-D is not a 3-D program) have pretty well muddled this issue for the spreadsheet-buying public. The essential feature of a 3-D spreadsheet program is the ability to manipulate multi-sheet ranges: solid blocks of cells consisting of several rows and columns on each of several pages. Programs that merely link cells or ranges between 2-D worksheets don't qualify.

Other things being equal, file-linking programs that are also 3-D offer some advantages over those that link 2-D files. They simplify the analysis and graphing of cross-sectional information in a consolidation setup, for example.

• **Windowing interfaces** The growing popularity of graphical user interfaces

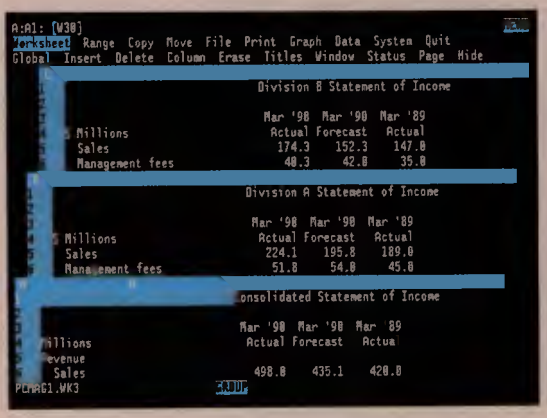
Financial publishing: making data comprehensible and fast

Financial publishing is more than just making numerical data look pretty. In the fast-paced business environment, the numbers for your regularly scheduled summaries and reports may change at the last minute. Yet this financial data must be published quickly and without error.

That's not to say that financial publishing doesn't have a make-it-pretty component. This concern is based on the premise that you can lead readers to raw spreadsheet data, but you can't make 'em think about it. Financial publishing helps by presenting it in an attractive, comprehensible, bottom-line fashion. Information summarised in concise tables with embellishments like boxes, borders, grids and high-resolution fonts is easier to interpret than reams of row and column printouts.

In the financial publishing world, however, spreadsheet data is often only one of the elements in a compound document. Most data-driven reports and proposals combine text, data and graphics; links from the spreadsheet program to other applications and utilities therefore become paramount. Hence, when you adopt a spreadsheet, you also must adopt the programs with which it interacts.

Lotus Development, WordPerfect, Microsoft and Borland are the best examples of companies pitching spreadsheet publishing solutions. Borland's Quattro Pro exemplifies a standalone solution, while the others involve some carefully cultivated bedfellows.


A:A1: [W38]
Worksheet Range Copy Move File Print Graph Data System Quit
Global Insert Delete Column Erase Titles Window Status Page Hide
Division B Statement of Income
Mar '90 Mar '90 Mar '89
Millions Actual Forecast Actual
Sales 174.3 152.3 147.8
Management fees 40.3 42.8 35.8
Division A Statement of Income
Mar '90 Mar '90 Mar '89
Millions Actual Forecast Actual
Sales 224.1 195.8 189.8
Management fees 51.8 54.0 45.8
Consolidated Statement of Income
Mar '90 Mar '90 Mar 89
Millions Actual Forecast Actua
Revenue
Sales 498.8 435.1 420.8
PCMAG1.WK3
READY

Your figures start out in worksheet form. Three-dimensional spreadsheets such as Lotus 1-2-3, Release 3 make updates easier because changes made to the underlying worksheets are immediately reflected in the consolidated worksheet

Excel-ent

With good looks and good links, Microsoft Excel (available for Windows, OS/2 and the Macintosh) is a top-notch candidate for spreadsheet publishing. Excel first proved that spreadsheets could be more than just number crunchers, but its publishing power does not come cheap. Its hardware requirements include a 286 (preferably a 386) PC, Microsoft Windows, EGA or VGA graphics and a mouse. The more memory, the better.

There's no disputing that Excel's graphical user interface, with its support for fonts and colour, borders and boxes gives you the tools to create hard-hitting charts and tables. Yet feature for feature, Quattro Pro now gives Excel a run for its money when it comes to financial publishing power. But thanks to the boost it gets from Windows, Excel is still ahead of the rest of the pack in terms of integration.

Two new Windows-based word processors, Ami Professional and Microsoft Word for Windows, not only contain excellent table making and formatting tools, but also support the Dynamic Data Exchange (DDE) protocol built into Windows, which lets Windows applications send data to one another.

Early DDE implementations were crude, but Word, Ami Professional and Excel are far more rigorous and reliable about it. Linking data does create a noticeable delay in your document editing, and you often face memory limitations, but that's a small complaint compared with all that DDE offers. For example, you can use Word's Paste-Link command to link one range of a formatted Excel spreadsheet to a table in a Word document, or even just link a spreadsheet cell to a paragraph. If the spreadsheet data changes, the document is automatically updated. If the document changes, the spreadsheet also changes.

Quattro Pro: Excel-lite?

Nipping at Excel's heels, Quattro Pro em-

Continued . . .

To get to the top, you have to be the best.

These days, merely possessing superior quality and design is simply not good enough. The harsh realities of the world in the 90's demands only the best. Anything else is irrelevant.

GoldStar has surpassed all previous standards of reputation in computer manufacture.

You now deserve the best.

But the best doesn't necessarily come expensively. The GoldStar range of machines are surprisingly affordable for computers of this exceptionally high standard.

Ask about the exciting features of the GoldStar range at any good computer dealer or ring this number today.

Call Nescom International, the exclusive Australian distributor on (02) 749 1552 and talk to James Lee.

Dealer enquiries welcome.

GoldStar

To Be The Best.

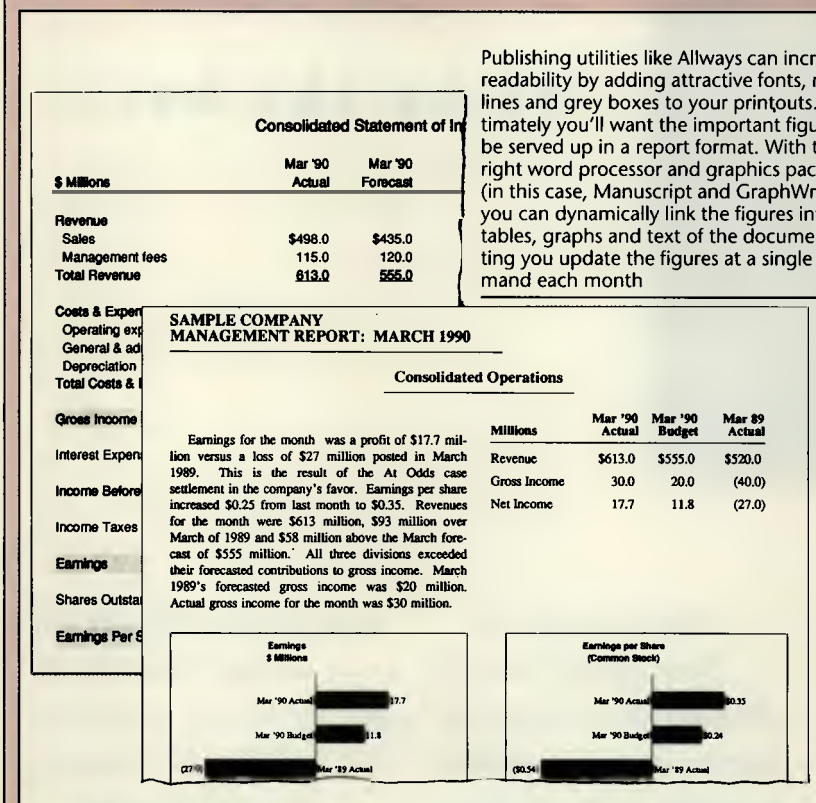
has had a discernible impact on the spreadsheet world. By the time you read this, Microsoft Excel may no longer be the only PC spreadsheet running in a graphical environment (see the section 'Over the horizon'). Meanwhile, Quattro Pro and Lucid 3-D have shown how effectively some of the advantages of a windowing environment can be replicated in a character-based program. These programs let you display multiple worksheets in windows that can be sized, moved, zoomed, tiled and stacked with keyboard commands or mouse. The mouse simplifies range selection and pointing, and the windowing commands make it possible to keep several contexts in view at once.

• **Worksheet publishing** Early in 1989, Funk Software's Allways arrived, bringing fonts, styles, point-size options, shading, boxes and lines of selectable weight to the printing of 1-2-3 worksheets. Allways instantly raised everyone's expectations about the quality of spreadsheet output. Never mind that Excel had been doing these things for more than a year; it took a 1-2-3 add-in to make the market really take notice. Since then, every major new spreadsheet program has included at least some of these enhanced printing capabilities, and Quattro Pro's built-in Bitstream fonts and superb graphics annotation features are particularly notable.

• **Interoperability** Until recently, if you wanted a spreadsheet program with file-compatible versions running on different computing platforms, your choice was Excel. Now, in addition to Excel (which runs on the Macintosh, under Windows and under OS/2 Presentation Manager), there's 1-2-3, Release 3 (with versions for character-mode OS/2 as well as DOS), and the forthcoming Wingz (a Macintosh product that will appear eventually in Windows and Presentation Manager versions). And 1-2-3/G, running under Presentation Manager, promises full file compatibility with both variants of 1-2-3, Release 3.

It's equally important to consider the company that a spreadsheet keeps. One of Excel's big advantages is its support of Dynamic Data Exchange (DDE), a Windows protocol that allows a growing number of applications to exchange information in memory without user intervention. With DDE, you can insert a spreadsheet or graph from Excel into a Word for Windows or Ami Professional document, and any changes you might

Financial publishing: making data comprehensive and fast



Consolidated Statement of In

$ Millions	Mar '90 Actual	Mar '90 Forecast
Revenue		
Sales	$498.0	$435.0
Management fees	115.0	120.0
Total Revenue	613.0	555.0

Costs & Exper
Operating exp
General & ad
Depreciation
Total Costs & I
Gross Income
Interest Exper
Income Before
Income Taxes
Earnings
Shares Outsta
Earnings Per S

SAMPLE COMPANY
MANAGEMENT REPORT: MARCH 1990

Consolidated Operations

Earnings for the month was a profit of $17.7 million versus a loss of $27 million posted in March 1989. This is the result of the At Odds case settlement in the company's favor. Earnings per share increased $0.25 from last month to $0.35. Revenues for the month were $613 million, $93 million over March of 1989 and $58 million above the March forecast of $555 million. All three divisions exceeded their forecasted contributions to gross income. March 1989's forecasted gross income was $20 million. Actual gross income for the month was $30 million.

Millions	Mar '90 Actual	Mar '90 Budget	Mar 89 Actual
Revenue	$613.0	$555.0	$520.0
Gross Income	30.0	20.0	(40.0)
Net Income	17.7	11.8	(27.0)

Publishing utilities like Allways can increase readability by adding attractive fonts, ruled lines and grey boxes to your printouts. But ultimately you'll want the important figures to be served up in a report format. With the right word processor and graphics package (in this case, Manuscript and GraphWriter) you can dynamically link the figures into the tables, graphs and text of the document, letting you update the figures at a single command each month

In this example, Lotus Manuscript is used to incorporate the data from the spreadsheet into a document. Both the table at the upper right and the figures in the paragraph of text are hot-linked to the spreadsheet. Similarly, the graphics were created using Lotus's GraphWriter, which also hot-links to the spreadsheet data. A single Manuscript command brings in the updated graphs and integrates them into the document

phasises publishing capabilities but doesn't make the hardware demands of the Windows environment. Quattro Pro runs in either character-based or graphics mode and can be optimised for a variety of machines in the DOS 640K environment.

Part of its publishing prowess stems from built-in Bitstream fonts: scalable fonts can be rendered on the fly. Quattro Pro also builds in line-drawing and box-shading tools. Hot-linked graphs can be embedded in spreadsheets and text can be linked to the graphed data. A small clip-art library, drawing primitives and a built-in slide-show feature round out the repertoire, making this the only self-contained solution that lets you create on-screen presentations as well as hard copy.

Quattro Pro can read and write 1-2-3, Release 2 files directly, and you can set it up to be completely keystroke-compatible with the Lotus program. However, Quattro Pro has almost no links to external applications, relying on the old .WK1 format to integrate data. It can be slow to print as well.

In a perfect world

PlanPerfect, WordPerfect and DrawPerfect present a respectable financial publishing solution, but one with a distinctly non-spreadsheet mindset. The hub of the Perfect trio is clearly word processing.

WordPerfect 5.01's new table editor lets you link in data from PlanPerfect, and you can quickly embellish it with enough fonts,

Continued . . .

Now for $2,790*, here's the new, compact TI microLaser...

the laser printer that you can upgrade to PostScript in minutes

One of the best things about our new microLaser printer is, that you can buy only what you need. You can buy the standard microLaser **for around $2,790**, knowing that when you're ready for it, you can upgrade to PostScript software and other powerful benefits later.

The standard microLaser emulates the HP Laserjet series II, and is the smallest laser printer available today. A 250-sheet paper drawer conveniently slides into the printer, which prints 300 x 300 dots per inch of high quality text and graphics at 6 pages per minute. It is both personal and powerful.

With the new PostScript microLaser, there is no need for technicians. You simply add up-grade boards.

These include up to four 1Mb increments of memory, serial and AppleTalk interfaces and a PostScript interpreter.

For additional fonts or emulations, all you do is, plug optional microCartridges into two credit card-size slots.

So, **for a total outlay of less than $5,000, you'll have a personal PostScript laser printer** that won't crowd your desk. (It's just 34.04cm wide and 36.07cm deep).

Yet it packs enough punch to take full advantage of the advanced software that runs on your PC.

That's because it uses the Adobe+ PostScript printer language and is compatible with HP LaserJet Series II - allowing you to switch between them easily.

With that kind of flexibility, this 6-page-per-minute microLaser is ideal for word processing, spreadsheet and desktop publishing applications.

And it enables you to print fonts in a variety of type styles and sizes. Plus, you can print them tall-ways, long-ways, all kinds of ways. You can even print complex pages of integrated text and graphics.

Look around. You won't find another laser printer that can match it for value and quality.

FREE DEMONSTRATION AND ASSESSMENT

For a free demonstration of the new TI microLaser and a free assessment of your laser printer needs whether PostScript or non-PostScript, call us today or fax or mail the attached coupon to:

Marketing Manager
Data Systems Division
Texas Instruments Australia Limited
6-10 Talavera Road
NORTH RYDE NSW 2113
FAX (02) 888 3415

PHONE NOW:
(02) 887 1122
(03) 267 4677

Please supply me today further information on the TI microLaser.

Name:.....

Title:.....

Company:.....

Street:.....

Suburb:.....

State:..... Postcode:..... Phone:.....

**Recommended retail price of TI microLaser $2,790 at time of printing*

With us, more things are possible.
TEXAS INSTRUMENTS

make in the spreadsheet would be reflected immediately in the document, and vice versa. If your work requires such two-way 'hot' or dynamic links, Windows is your environment of choice.

Eventually, you may be able to create similar links between Lotus applications with the help of the Lotus Programming Language (formerly known as LEAF), but so far this is available only for 1-2-3, Release 3. Lotus and WordPerfect have also promised that 1-2-3/G and the forthcoming Presentation Manger version of WordPerfect will have easy two-way dynamic linking between them, but as yet no arrival date has been set for the latter.

In the meantime, 1-2-3's .WK1 format is the lingua franca of the spreadsheet world and is understood by a growing number of non-spreadsheet applications as well. If your spreadsheet exports to .WK1 files (and most of them do), you can 'warm link' your worksheets to documents created by one of the two dominant word processing programs, WordPerfect 5.1 and Microsoft Word 5.0. These let you embed worksheets into your documents and refresh the information from disk each time you call up the document file, which is sufficient for many applications.

• **Database connectivity** One of the most important advances that 1-2-3, Release 3 offers over previous versions of 1-2-3 is DataLens, a protocol that allows Lotus and third parties to write drivers for accessing external databases. With the right driver in place, you can perform queries and extracts on remote data files with essentially the same commands you'd use to analyse data in a worksheet file. Lotus supplied a sample driver for dBASE III/dBASE III Plus files with the first shipment of 1-2-3, Release 3. At press time, no other DataLens drivers had emerged, but third-party drivers for Oracle, Novell's NetWare SQL, Microsoft's SQL Server, OS/2 Extended Edition's data manager, and others are expected later this year.

Microsoft has countered by practically giving away copies of Pioneer Software's Q+E utility with Excel. Q+E gives Excel users essentially the same dBASE outreach capability that the sample DataLens driver gives to 1-2-3, Release 3 users. Borland followed suit in Quattro Pro, giving it easy connectivity to the company's own Paradox and Reflex database files, as well as to dBASE files.

Review criteria

For this review, we selected file-linking spreadsheet programs — with or without 3-D capability — that were available by early December 1989. The 10 that met these criteria include a little of everything: a memory-resident spreadsheet with strong links to a particular set of accounting software (Lucid 3-D); three high-end integrated packages (Framework III, Enable and SmartWare II) with strong spreadsheet components; and four of the strongest Lotus challengers (Microsoft Excel, SuperCalc5, PlanPerfect 5.0 and Quattro Pro). Also meeting the test, of

Financial publishing: making data comprehensive and fast

boxes and rules to knock your socks off. Bring DrawPerfect into the act and you can add arrows, logos and scanned or clip art. DrawPerfect also offers a slide show capability and imports a sizable number of graphics file formats.

One advantage of using this trio is that the interface is consistent among them. But realise that PlanPerfect is doomed to remain WordPerfect's low-profile sidekick. It's doubtful that it will ever be a robust rival for competing standalone spreadsheets.

PlanPerfect's links to the non-Perfect world are shaky, too. The program tries to incorporate an optional Lotus interface but doesn't pull it off very well; it also bungles the translation from the .WK1 format. WordPerfect itself imports .WKS, .WK1 and Excel spreadsheets, but loses many of the original formatting attributes in the process. For this reason, the Perfect group isn't the best choice unless you're already a WordPerfect office.

The great divide

Lotus's release of 1-2-3, 2.2 and 3.0 fractured the once-monolithic Lotus community. The split is based on equipment: Release 2.2 for configurations that include 8088s, and 3.0 for 286s and more powerful machines.

Contrary to what you may think, when it comes to spreadsheet publishing, Lotus's newest release is not the best. While the long-awaited 3.0 certainly made good on its promise of new and more-powerful analytical capabilities, spreadsheet publishers are left in the cold.

Spreadsheet publishing in Release 3.0 is a bet on a promise. No doubt Lotus will make good on its pledge to add Allways or similar capabilities to Release 3.0, but it's still uncertain whether the implementation will be a third-party add-in with a new interface (like the proposed LEAF), or built into Release 3.01. Regardless, the slow pace at which 3.0 unfolded in the first place has not instilled much confidence.

File compatibility is another drawback. With the exception of Lotus's own Manuscript and Freelance Plus, no programs accept Release 3.0's .WK3 files. Today's 3.0 users must translate their .WK3 data to the more standard .WK1 and .WKS files for data exchange, just like everyone else.

In its wisdom, Lotus bundled Funk Software's Allways with Release 2.2 for free. First available as an add-in for Release 2.01, Allways staved off many an Excel-thirsty user by accommodating WYSIWYG previews, support for downloadable fonts and font cartridges, and better formatting such as boxes, lines and shading. PC Publishing's Impress, though not bundled with 1-2-3, has the advantage of letting you edit directly on the WYSIWYG display instead of jumping back to the spreadsheet as you must do with Allways.

There's a great deal to look forward to in 1-2-3/G, Lotus' graphical spreadsheet for Presentation Manager. It adds much-needed twists, such as the use of colour palettes by selection and a handsome preview window, to the spreadsheet-by-GUI theme. At the same time, it uses keyboard-compatible cascading menus, a boon to those migrating from the character-based world. Lotus and WordPerfect's recent technology-sharing agreement should allow cosy data exchange between 1-2-3/G and the upcoming PM version of WordPerfect — good news for spreadsheet publishers.

The roads not taken

Any package that generates a .WK1 or .WKS file can be tweaked to become part of a financial publishing solution, and that means just about all of them. SuperCalc5 is a more serious contender than most. It has analytical power, excellent graphics and even word wrap for lengthy annotations, though it lacks dynamic links to other applications or WYSIWYG add-ins.

Desktop publishing programs may appear to be obvious candidates, but appearances are deceiving. First, the people who prepare spreadsheets for publication are often administrative or secretarial staff who are more comfortable with word processors and spreadsheets than with DTP programs. And second, facilities to set up permanent links between spreadsheet and DTP programs are almost non-existent. Ventura Professional Extension's data integration falls short when compared with Word or WordPerfect's ability to work directly with spreadsheet data.

Xerox has ambitious plans to make Ventura Publisher a hub of spreadsheet and database publishing, and other programs such as dbPublisher are already adding oomph to this scenario. The picture may change more when Aldus upgrades PageMaker to support DDE or when the OS/2 environment provides better tools for linking data. But for now, DTP programs are best reserved for less hurried, more-design-intensive jobs than financial publishing.

Robin Raskin

Plus Passport™

Emerging as the Data Security Standard

The Answer to your Security Needs.

Passport, the portable hard disk distributed by Tech Pacific.

If your PC users need removable mass storage, they've had to give up a lot. That's because until now, removable storage made you settle for low capacity. Lacklustre performance. And questionable reliability.

But now, there's a powerful removable hard disk with no compromises. Plus Passport. It comes from the same people who developed Hardcard.

What makes Plus Passport different from all the rest is its performance. It gives you 40 or 20 Mb of capacity. Along with an effective access time of 28ms. Which is as fast as the 286/386 class fixed hard disks.

With proven Winchester technology and 60,000 hour MTBF, it's three to five times more reliable than most other drives, removable or not.

As a result, it's easy to make Passport your primary mass storage device. For any PC. Whether it's a PC/XT/AT class computer, or the IBM PS/2 Micro Channel System.

Passport can be installed next to your floppy disk drive, or in a free-standing external chassis. Either way, the **Passport hard disk can be removed in seconds. Which makes data easy to secure. And easy to transport.**

You can even put it in a briefcase and take your data from one computer to the next. Anywhere in the world. Passport can withstand up to 150 Gs of shock which makes it one of the most durable hard disks ever built.

When you put it all together, Passport gives you a powerful way to improve both security and productivity. Call the Plus Product Manager on (02) 697 7111 now. We'll send you a brochure free, explaining the security features and what makes Plus Passport the most powerful Hard disk ever released.

Plus

Tech Pacific
LEADERS IN PC ENHANCEMENT

Tech Pacific, Unit 1, 5-15 Epsom Rd., Rosebery, NSW 2018

course, were the two latest from Lotus: 1-2-3, Releases 2.2 and 3.

Over the horizon

Due to our editorial deadlines, we were unlucky enough to miss the release dates of three major new spreadsheets: 1-2-3/G, VP Planner 3D and Wingz. By the time you read this, some of these programs will be available.

Informix's Wingz, a transplant from the Macintosh, will bring an interface even more visually exciting than Excel's to both OS/2 Presentation Manager and Microsoft Windows. 1-2-3/G for Presentation Manager (graphical version of 1-2-3, Release 3) promises all the functionality of their DOS counterparts — and more. VP Planner 3D, keeping the faith in the character-based world, will be a much-enhanced upgrade of VP Planner Plus, with 3-D worksheets and rotational commands.

Farther around the bend, it would not be unreasonable to expect a new version of Microsoft Excel, which hasn't seen a major upgrade since 1987. Even without an overhaul, Excel stands to gain more speed and capacity plus improved network support sometime in 1990, if rumours about the upcoming new version of Windows are to be believed. As we went to press, Lotus was openly discussing the possibility of a 1-2-3/G for Windows as well, but had made no commitment to deliver it. And Borland announced its intention of developing both Windows and Presentation Manager versions of Quattro Pro.

How we tested them

We subjected the 10 spreadsheets reviewed here to a common testing script that evaluates both quantitative and qualitative attributes. We measured worksheet capacity and memory usage; logged recalculation times for several different kinds of worksheets; created file links, then moved and renamed the linked cells to see if the programs kept in step; created, customised and printed charts; and measured sorting times for a large internal database. The results are recorded in a performance chart and a features table.

In addition, the reviewers were asked to assign suitability-to-task ratings for five categories of work: conventional spreadsheet operations, consolidation (with file linking and/or 3-D worksheets), analytic graphing, presentation services (quality output from both worksheets and graphs), and interoperability (manual and automatic links with other applications and platforms). For each category, a program received a rating between 0 (completely unsuited) and 4 (best for the task).

An uphill road

Lotus sold more copies of Release 2 than Release 3 during late 1989 and early 1990, which reveals an interesting truth: spreadsheet users care more about getting their work done than about the latest, hottest worksheet technology.

As Lotus itself is discovering, chipping market share away from the Release 2 standard is like trying to erode Gibraltar with a seltzer bottle. For every pair of users ready to jump, there must be three newcomers eager to embrace the current standard, and all for the best of reasons: millions of dollars invested in training and applications are of more account than a new set of file-linking features.

TOPFLY
C&C COMPUTER & COMMUNICATION
TOPSCAN
IMAGE SCANNER
• SCANNING A4 SIZE DOCUMENT MAXIMUM
• RES. UP TO 300DPI×300DPI
• SCANNING SPEED UP TO 9.9, 16, 20 SEC, SELECTABLE FOR A4 SIZE
• THE DIMENSION: 14.5 × 5.1 × 20.5 INCH
• THE WEIGHT: 8.6 KGS (19 LBS)
• A BLACK & WHITE SCANNER
TOPFLY INDUSTRIAL CO., LTD.
7F-4, NO. 69, LANE 390, TUN-HWA S. RD.,
KOLIN BUILDING, TAIPEI, TAIWAN, R.O.C.
TEL: 886-2-7732987-9, 7315217-9
FAX: 886-2-7764850 TLX: 13268 TOPFLY

Like anyone in business today, a banker or financier can't afford to make anything less than a perfect impression.

Presentation quality has a direct effect on their standing in the business community, particularly in the areas of correspondence and documents.

The Star XB 24-15 printer delivers this superior print quality demanded by the finance world and does it at an exceptionally high speed.

The XB 24-15 offers a host of other features – simple paper handling convenience, easy front panel operation, and compatibility with most computer systems and software packages. The standard inclusion of brilliant colour printing ensures it can meet all your requirements at an affordable price.

Star are the world's largest specialist computer printer company and can supply the model best suited to your needs from their large range of dot-matrix and laser printers.

They've got a reputation you can bank on.

For the complete Star story, including details of all our models, simply call your state office.
Sydney 748 4300,
Melbourne 544 6676,
Brisbane 875 1551,
Perth 344 2488,
Auckland 570 1450.

star micronics computer printers

KAZOO STAR 1295

File-linking spreadsheets: summary of features

Products listed in ascending price order	Lucid 3-D $220	SuperCalc5 $695	PlanPerfect $715	Quattro Pro $750	Microsoft Excel $835	Lotus 1-2-3 Release 2.2 $855	Lotus 1-2-3 Release 3.0 $995
General information							
Minimum RAM required	256K	512K	384K	512K	640K	320K	1024K
Minimum disk space required	300K	1.2M	1.4M	3.7M	1.5M	320K	3M
Hard disk required	○	●	○	●	●	○	●
Conventional memory available for data	400K	200K	290K	Variable	180K	375K	400K
Expanded memory (LIM EMS version)	4.0	4.0	3.0	4.0	4.0	3.2	4.0
Extended memory	○	○	○	●	● (OS/2 only)	○	●
Virtual memory	○	○	●	●	● (OS/2 only)	○	● (OS/2 only)
LAN version available	○	●	●	●	●	●	●
OS/2 version available	○	○	○	○	●	○	●
Macintosh version available	○	○	○	○	●	○	○
Hardware							
Numeric coprocessor:							
8087	●	●	●	●	○	●	○
80287	●	●	○	●	●	●	●
80387	●	○	○	●	●	●	●
Works with mouse	●	○	○	●	●	○	○
Adapts to full-page monitors	●	●	●	○	●	○	○
Extended EGA/VGA text mode	●	●	○	●	○	●	●
Changes screen colours	●	●	●	●	●	○	○
User interface							
Menus:							
Lotus-style	●	●	●	●	○	●	●
First-letter-sensitive	●	●	●	●	●	●	●
Pull-down	●	○	●	●	●	○	○
SAA-compliant	○	○	○	○	●	○	○
Custom	●	●	●	●	●	●	●
Maximum workspace:							
Open files	9	255	2	64	Unlimited	1	256
Pages per worksheet	1	255	1	1	1	1	256
Rows per page	9999	9999	8192	8192	16,384	8192	8192
Columns per page	254	255	256	256	256	256	256
Column widths (characters)	0-254	2-127	0-255	0-256	0-255	1-240	1-240
Split screens:							
Maximum number of screens	2	2	2	2	4	2	2
Formats multiple screens independently	●	○	●	●	●	●	●
Scrolls multiple screens independently	●	●	●	●	●	●	●
Hidden rows/columns/cells	○/●/●	○/○/○	○/●/●	○/●/●	●/●/● (cells with formulas)	○/●/●	○/●/●
Multi-step undo	○	●	○	●	●	●	●

● — Yes ○ — No

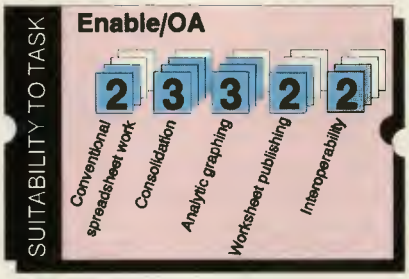
Continued . . .

	Enable/OA $1080	Framework III $1095	SmartWare II $1095
	640K	640K	640K
	2.5M	600K	3M
	●	○	●
	Variable	270K	270K
	4.0	4.0	4.0
	○	●	○
	○	●	●
	●	●	●
	●	○	○
	○	○	○
	●	●	●
	●	●	●
	●	●	○
	○	●	○
	○	●	●
	○	●	●
	●	●	●
	●	○	●
	●	●	●
	○	●	○
	○	○	○
	●	●	●
	8	Unlimited	255 (with DOS)
	32	1	1
	9999	32,000	9999
	1024	32,000	999
	0-72	0-255	0-80
	3	1	2
	○	N/A	●
	●	N/A	●
	○/●/○	○/●/○	●/●/●
	●	●	○

continued on page 80

Nevertheless, the market grows, and as it does, so does the number of users for whom the old 1-2-3 standard is no longer enough. A growing number of vendors stand ready to serve you, and you'll find their offerings on the following pages.

Enable O/A



Enable Software's $1080 Enable/OA integrated software offers a spreadsheet module chock-full of functions, including both linked and 3-D files, and dazzling graphics facilities. The spreadsheet's command system uses the two-line horizontal menus made familiar by Lotus 1-2-3; the structure is consistent throughout the word processing, database and communications modules. Transferring data between the applications is as easy as jumping into the next window.

But the integrated nature of Enable leads to some weaknesses. Because there are so many application choices, some commands take quite a few keystrokes to issue. For instance, most spreadsheets present you with a blank worksheet as soon as they're loaded, but in Enable you must first go through a configuration screen, make three menu selections and then name a file before you get to the same place. Opening a second spreadsheet window requires pressing six different keys and typing in a filename. Even the speed-key sequences can require as many as three keystrokes. Hence, the advantage of working with several applications at once must be weighed against the trouble of this extra finger work.

Enabling your system

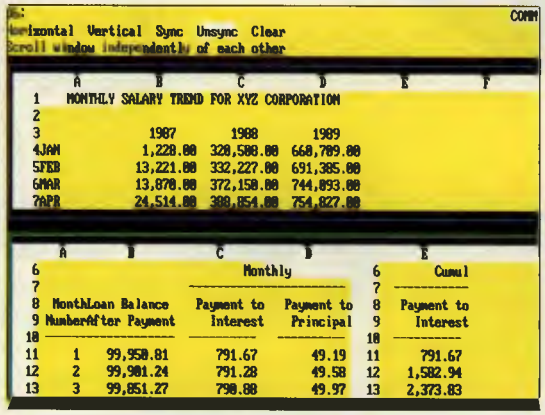
Enable's worksheet screen is utilitarian, offering the bare minimum of styling and allowing for little colour variation. The only information you see, aside from the row and column labels and the current cell contents, is the mode, filename, highest cell address and window number. The program doesn't support a mouse.

Enable's windows are one of the best parts of its interface: eight can be open at once, and they can be resized, moved and split horizontally or vertically. You can put a copy of the same spreadsheet in two or more windows to compare alternate assumptions at a glance. Windows also make it easy to copy data between spreadsheets or from a spreadsheet to another application; inserting a spreadsheet and graph into a word processing document or pulling database information into a worksheet is made quite simple. You can even work on a file in one window while a time-consuming process, such as a database sort, goes on in the background of another window.

Enable's 3-D spreadsheets offer dynamic links between worksheets, which are automatically updated in memory when you recalculate. Enable also permits a form of file linking that lets you tie worksheets together without opening more than one. One of the program's handy tricks is the ability to display the three levels of a 3-D spreadsheet in one window; you can also hide up to 29 levels so they won't print.

Big and beautiful

A worksheet in Enable can be as large as 1024 columns by 9999 rows. You can carry this worksheet down to 32 levels, giving you almost 328 million cells with which to work. However, these figures can be deceiving. Because of the way memory is managed in Enable, any cell



Enable/OA's windows can contain different worksheets or different portions of the same worksheet. You can split each window horizontally and vertically

At a glance

Enable/OA

Distributor:	Optsoft
Telephone:	(02) 680 3930
Price:	$1080
Requires:	640K of RAM, hard disk recommended, DOS 2.0 or later
In short:	This integrated program's spreadsheet offers welcome 3-D facilities and (with Perspective) excellent graphics. But it suffers from memory management problems and slow performance.

with more than 256 characters of information and references must be stored in conventional rather than expanded memory; thus you can quickly hit the 640K wall. This problem occurred the first time we tried to import such a highly referenced worksheet for our first benchmark test. Though this situation is hardly representative of most spreadsheet work, that doesn't excuse Enable's problematic memory management.

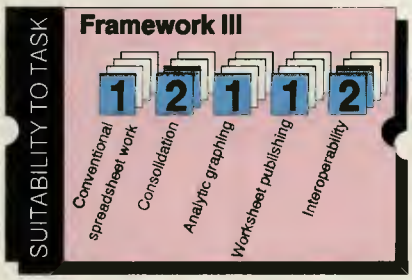
Nearly 140 functions are available, including some not found in Lotus 1-2-3, such as cumulative percentages. You can format numbers in 19 different ways, and the labels can be bold, underlined or italic; if you want to get any fancier, you'll have to transfer the worksheet into Enable's word processor.

Enable's native graphics facilities can produce only the standard two and three-dimensional business graphs and support a maximum of only eight data points. But Perspective, an add-on that comes with it, lets you graph your Enable data in a spectacular variety of ways. For instance, it lets you turn the bars in a 3-D bar graph into drum-like shapes, then lets you stretch a bar to make its closest point seem even closer. Thirty-two preset graph types can display your data in ways ranging from beautiful to bizarre and the colour choices are splendid.

As a spreadsheet, Enable is merely standard, though its integration with the other applications in the Enable series is good and its ability to access Perspective's fancy graphics is quite a plus. If either of these considerations has a high priority with you, Enable may be worth a look. But its clumsiness and its memory limitations make others a better choice if spreadsheets are your main application.

Henry Fersko-Weiss

Framework III



Ashton-Tate's $1095 Framework III combines spreadsheet facilities with word processing, database and communications within an innovative windowing interface that has its own programming language. You'll appreciate Framework's visual appeal: it uses on-screen colour and

SOLUTIONS
by a
MASTERHAND
386/33
J. BOND
Computer Systems Co.
No. 406, 1st Section Kwang-Fu Rd.
Hsin-Chu, Taiwan, R.O.C.
Tel: 886-35-782050-2 Fax: 886-35-773294
What happens if several experienced R&D engineers, all of whom having worked with ERSO (the Taiwanese government-sponsored Electronics Research & Service Organisation) for years, start their own production of mainboards? They create reliable, high performing state-of-the-art solutions such as a Cache 386-25/33 board, for which, of course, all copyrights are reserved. Or they provide a demanding clientle with designs that accurately meet your needs and specifications. What you'll get is an utmost of performance, reliability and compability. Call us and find out what J. Bond's team of experts can do for you!

INTRODUCING THE NEW BALANCE OF POWER ....

QUATTRO PRO is the only spreadsheet that gives you powerful consolidation and advanced publishing capabilities, without sacrificing the size of the spreadsheet you can handle:

- **Large spreadsheet capacity new VROOM technology lets your largest spreadsheet run on any PC, from XT to a 386**
- **Compatibility - macro, file & keystroke compatible with 1-2-3 Ver.2.01, makes it easy to move up to QUATTRO PRO**

Distributed exclusively by:

Tech Pacific
LEADERS IN PC ENHANCEMENT

SYDNEY: 5-15 Epsom Road, Rosebery NSW 2018 Ph: (02) 697 7111
MELBOURNE: 219 Glenhuntly Road, Elsternwick VIC 3185 Ph: (03) 523 0866
BRISBANE: 165 Moggill Road, Taringa QLD 4068 Ph: (07) 371 7866

❑ Please send me more infomation on QUATTRO PRO

Mail to : Melinda Stewart, Tech Pacific
PO Box 313 Rosebery
NSW 2018

Mr/Mrs/Ms _____
Title _____
Company _____
Address _____
_____ Postcode _____
Phone _____ Fax _____

BORQP APC 1/10/89

Framework III's 'containing frames' are the heart of the program's integration capabilities. Files in a containing frame are saved, loaded and updated as a unit, so you can create compound documents linked in an outline-like format

pull-down menus effectively and lets you move, resize and zoom worksheet windows with ease. But its spreadsheet is basic in most respects and positively anaemic in others. Only its size (32,000 rows by 32,000 columns) makes it stand out in the spreadsheet arena.

As you may know, Framework has its own terminology. The main work area — the desktop in Framework parlance — can hold an unlimited number of 'frames' or windows. You can move and size the frames in conventional fashion, then collapse them down to their titles in the 'frame tray' at the lower-right-hand corner of the desktop. This makes it easier to keep many frames open at once, ready for expansion when you need them.

But the heart of the design lies in 'containing frames' that can be used to hold and save a number of related frames together as a unit. A containing frame holds other frames inside it. These may be simply a collection of frames, similar to papers thrown together in a folder, or they can be part of a highly structured outline with levels and sublevels. With containing frames, you can tie different types of documents together and alter their contents simultaneously simply by highlighting the border of the containing frame or one of the lower-level containing frames, then issuing format commands.

This design is a powerful integration tool. For example, you might set up a containing frame for new products, with a top outline level holding a word processing document on company goals, a graph showing purchase patterns and several variants of a balance sheet for the next five years. Then, at the second level under each of these frames, you would have other word processing, graph and spreadsheet frames displaying the supporting details.

At a glance

Framework III

Distributor: Ashton-Tate
Telephone: (02) 953 9500
Price: $1095; upgrade from any previous version, $275
Requires: 640K of RAM, hard disk recommended, DOS 2.0 or later
In short: Framework III sports an attractive and innovative user interface whose outlining metaphor makes it possible to integrate spreadsheets, documents and database information in a very sophisticated fashion. Sadly, its spreadsheet is undistinguished, with weak functionality and poor graphics. Power spreadsheet users should be elsewhere if they need an integrated package.

Rating the spreadsheet functions

The spreadsheet facilities in Framework are straightforward. The numeric formats are just as basic: date, integer, currency and the like.

Although there are a great many Framework-specific functions for use in formulas, the program is a little weak on the standard spreadsheet functions. You get only six financial and seven statistical functions, though logic and math functions are more numerous. It offers bold, italic, underline, strike-through, superscript and subscript. You can see these on the screen, which is nice, but it would be better to have a wider selection of text enhancements.

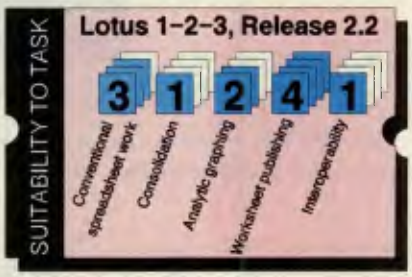
The graphing facilities in Framework are also weak. The program offers only six basic graph types: bar, line, pie, point, xy and hi-lo-close-open. You can vary these slightly, but you can't produce a 3-D graph or change to a horizontal orientation. Labels must appear across the first row or down the first column to be picked up in the legend or used along the x-axis, and you have no control over the position of the legend. You also can't control the colours or hatching pattern for graph elements, or the text size and fonts used in labels and the legend. In our test bar graph, the title 'Monthly Salary Trend for XYZ Corporation' ran right over the legend because of its length, and the only way to fix it was to shorten the title or use Framework's internal programming language to create a two-line title.

As you might expect, Framework III's strong point is that it lets you link spreadsheets together easily. Consolidated links let you tie a cell in one worksheet to a computed value in another. You might, for example, sum a group of cells and then bring that total over to your linked cell. Its weak point is performance. You can't recalculate in the background, and foreground recalculation is slow — near the bottom of the pack, according to our performance tests.

Framework's unique outlining abilities merit consideration from anyone looking for an integrated package. But the weakness of its spreadsheet module and the limitations of its graphics facilities make it a questionable choice if the spreadsheet is your most important application.

Henry Fersko-Weiss

Lotus 1-2-3, Release 2.2



Lotus 1-2-3 has been the spreadsheet standard on DOS machines almost since it first came out, but with the introduction of Release 2.2 and 3.0, and 1-2-3/G, this once-solitary standard has branched out. Of the three, Release 2.2 is the most conservative choice: it can run even on an ancient, dual-floppy disk PC with as little as 320K of RAM.

Priced at $855 (or $250 for an upgrade), Release 2.2 improves on the old 2.01 standard with a number of new features. Certainly the most eye-catching of these is its better-looking output. Part of the credit is due to Release 2.2's better graphics capabilities (for example, instead of keeping all the x-axis labels on one line,

It's new
It's fast...

The unrivalled quality, reliability, performance and price.

386-Turbo

- 20 or 25 MHz
- Up to 16 Mb RAM
- 71 Mb Voice Coil Hard Disk
- TsengLabs VGA
- MS DOS 4.01
- Runs OS/2
- And many more irresistible features . . .

Contact your nearest dealer NOW!

DELTACOM AUSTRALIA

DEALER ENQUIRIES WELCOME.

ALFA COMPUTERS Pty Ltd. Unit 1, 620-632 Botany Rd, Alexandria, NSW 2015. Ph: (02) 317 3344. Fax: (02) 317 3859.

File-linking spreadsheets: summary of features

continued from page 75

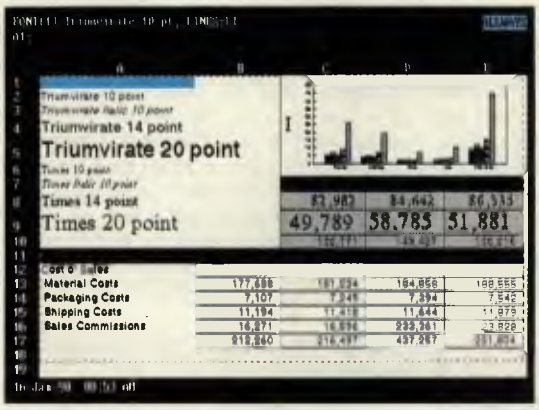
	Lucid 3-D	SuperCalc5	PlanPerfect	Quattro Pro	Microsoft Excel	Lotus 1-2-3 Release 2.2	Lotus 1-2-3 Release 3.0
Programmable hotkeys	●	●	●	●	●	○	○
Can extract partial spreadsheet	○	●	●	●	●	●	●
Cut-and-paste via clipboard	●	○	●	●	●	○	○
Automatic backup	●	○	●	○	●	○	○
Functions and operations							
Logical and arithmetic operators	8	15	29	14	77	17	17
Functions:							
Math	17	18	26	19	22	17	17
Logical	5	19	14	8	6	9	8
Statistical	8	15	7	10	12	7	10
Financial	12	18	10	18	20	11	12
Date and time	9	18	14	12	13	11	13
String	5	20	17	21	14	19	18
Database	4	None	6	9	11	7	11
User-defined	●	○	●	○	●	○	○
Matrix manipulation	○	●	●	●	●	●	●
Regression analysis	○	●	●	●	●	●	●
What-if-tables	○	●	●	●	●	●	●
Linear and non-linear optimisation	○	○	○	●	○	○	○
Recalculation:							
Automatic/manual	●/●	○/●	●/●	●/●	●/●	●/●	●/●
Background	●	○	○	●	●	○	●
Intelligent	●	●	●	●	●	●	●
Natural	●	○	●	●	●	●	●
Row-wise	○	○	●	●	○	●	●
Column-wise	○	○	●	●	○	●	●
Iterative	●	●	●	●	●	●	●
File-linking features							
Can use link in function argument	○	●	○	●	●	○	●
Link returns a constant/a formula	●/○	●/○	●/●	●/●	○/●	●/○	○/●
Can use wildcards to specify linked files	○	●	●	●	○	○	○
Links to non-existent data	●	○	○	●	●	●	●
Updates links (on demand/automatically)	●/○	●/○	●/●	●/○	●/●	●/○	●/○
Saves groups of worksheets in workspace	○	○	○	●	●	○	○
3-D features							
Multiple 2-D sheets in a single file	None	255	None	None	None	None	256
Defines ranges across pages	○	●	○	○	○	○	●
Groups sheets for common cursor movement	○	●	○	○	○	○	●
Formats sheets together	○	○	○	○	○	○	●
Rotates worksheet cube	○	○	○	○	○	○	●

● — Yes ○ — No

Continued . . .

Enable/OA	Framework III	SmartWare II
○	●	●
●	○	○
○	●	●
●	○	●
15	11	18
22	20	23
15	13	12
12	7	9
11	6	16
25	14	26
22	16	22
None	5	12
○	●	●
○	○	●
○	○	●
○	●	○
○	○	○
●/●	●/●	●/●
● (in second window)	○	●
●	○	●
●	●	●
○	●	●
○	○	●
●	●	●
●	●	●
●/○	●/●	●/○
○	○	○
●	●	●
●/○	○/○	●/○
●	●	○
32	Unlimited	None
●	●	○
○	●	●
●	○	○
●	○	○

continued on page 86



Allways, a printing and formatting add-in included with 1-2-3, Release 2.2, creates eye-catching output with fonts, boxes, lines and shading in a WYSIWYG environment. It lets you print a graph and the corresponding worksheet on the same page

it automatically creates two lines if necessary). But most of it is due to Allways, a printing and formatting add-in that Lotus bundles with Release 2.2.

Allways makes printing more convenient: it prints graphs without forcing you to leave 1-2-3 and go to PrintGraph; it lets you print spreadsheets in either portrait or landscape orientation; and it lets you include one or more graphs on the same page as a spreadsheet. But you can also use it to dress up your worksheets with Helvetica and Times-Roman look-alike fonts ranging in size from 5 to 24 points, as well as adding boxes, lines and shading. Allways creates visually striking output, with or without graphic elements, but its usefulness suffers from its incomplete integration into 1-2-3. For example, if you want to use the 1-2-3 Print menus for draft output and Allways for quality hard copy, you'll find that you have to set the print range separately in Allways and in 1-2-3. Allways also requires a minimum of 512K of RAM in your PC, so you'll need to consider that if you often create spreadsheets that strain the memory in your system.

File linking is another notable feature that is new to Release 2.2. Now you can read data from one or more .WK1 or .WKS files into your worksheet. This feature is long overdue and is still somewhat primitive when compared with the linking facilities in Excel or Lotus's own Release 3, but it's welcome nevertheless.

A familiar face

Release 2.2's biggest advantage is its antecedents; anyone familiar with Release 2.01 will be immediately comfortable with 2.2. Its menus are essentially the same, though they do contain additional choices hidden in various nooks and crannies. Even the Allways menus follow the familiar Lotus logic. A nice extra touch is the addition of setting sheets, which show you all the current settings for a given function. For example, if you choose /Worksheet Global, Release 2.2 displays all the global settings, so you don't have to reset them all to be sure they're right.

An undo command, a learn mode for macros and a macro manager (an add-in that lets you keep macros in memory separate from the spreadsheet) are all new to Release 2.2. You can now find label and formula text (using the program's /Range Search command), and you can finally invoke Release 2.2 with a particular worksheet from the command line. Also included are network controls that prevent two users from changing the same file at the same time (a network server version is also available).

At a glance

Lotus 1-2-3 Release 2.2

Distributor:	Lotus Development
Telephone:	(02) 287 1900
Price:	$855 (includes Allways); network server version, $995 plus $495 per node; upgrade from any previous release, $275
Requires:	320K of RAM, two disk drives, DOS 2.0 or later. Allways requires 512K of RAM and a hard disk
In short:	1-2-3 Release 2.2 is no longer the undisputed standard, but it runs well on virtually any DOS system, and the eye-catching output that Allways produces brings it up to that of the competition in desktop publishing and graphics. It's still an excellent choice for long-time 1-2-3 users who don't need the sophisticated linking features that Release 3.0 or competitors offer.

1-2-3, Release 2.2 breathes new life into a hardy classic. It's not as sophisticated as much of its competition, but if you're barely bumping up against Release 2.01's limitations, Release 2.2 offers the benefit of familiarity while remaining compatible with all your previous add-ins and giving you far better-looking output.
David Stone

Lotus 1-2-3, Release 3.0

1-2-3's Releases 2.2 and 3.0 descend from the same ancestor, so it's not surprising that they have so much in common. They even sport similar prices, with the $995 Release 3.0 listing for a scant $140 more than Release 2.2. But the two programs are quite dissimilar in important respects, of which 3.0's increased hardware requirements and its support for OS/2 are only the most obvious. It's misleading to view Release 3.0 as merely a bigger and better version of the old standard; in fact, it's a brand-new program that happens to be modelled on Lotus's best-selling classic.

Since it uses DOS extender technology to reserve more memory for spreadsheets, the DOS version of 3.0 requires a 286 or 386-based PC with at least 1M of extended (not expanded) memory. The OS/2 version requires at least 3M of RAM; 4M is recommended. Lotus supplies both a DOS and OS/2 version in its Release 3.0 package; you can install either one or both. In operation, the two versions are essentially identical.

Release 3.0's most significant new features are its three-dimensional workspace, which lets you build multi-page worksheets and work with multiple files in memory; and its file-linking abilities, which allow you to write formulas in one file that address 2 or 3-D ranges in another. The two features work similarly in some ways. In either case, you can, for example, see up to three spreadsheet pages on the screen at once and move easily from one to another. But in fact, using a 3-D worksheet gives you some additional capabilities: with it, you can create a single range through a stack of worksheet pages much as you'd create a range over the rows and columns in a single 2-D worksheet.

While most multi-page models can be built using either approach, some may fit more naturally into one or the other. In general, if you are collecting data from different sources, the linking approach makes more sense, while the 3-D approach is best for files over which you have total control. You'll probably appreciate this flexibility most if you build and use multi-worksheet models regularly. But if you do this only occasionally, the two options are similar enough to be confusing.

Better graphics and database functions

Release 3.0 is stronger on graphics features than 2.01 or 2.2, offering line, bar, xy, stacked bar, hi-lo-close-open, area and mixed graphs. One particularly nice touch is its ability to display a graph on the screen along with your worksheet. As with Excel, you can change numbers in the worksheet and watch the effect on the graph, though in 1-2-3's case you can show only one graph at a time.

Release 3.0's graphs are also better looking. Where 2.01 crowds a bar graph by butting the bars against the frame, 3.0 leaves a welcome space. (Release 2.2 offers similar improvements in graphics, but 3.0 does a better job.)

Just as welcome is the fact that Release 3.0 integrates graph printing functions into its menus, doing away with the separate PrintGraph program. Unfortunately, because Allways does not run under Release 3.0 (it must be rewritten to the requirements of 3.0's new add-in scheme), you can't get the stunning output you can produce from Release 2.2. Lotus promises to add Allways to Release 3.0 as soon as it becomes available, but until then, you're stuck with boring, monospaced type and dashes, and you'll have no way of printing graphs and worksheets side by side.

A significant advance over the Release 2 standard is Release 3.0's vastly expanded database capabilities. Its Data External commands, with the appropriate DataLens drivers, let you write and retrieve data to and from external database files from within the 1-2-3 environment. As of this writing, drivers were available only for dBASE III and III Plus files, but a Lotus spokesperson says that additional drivers are currently being developed both by Lotus and by key database software developers.

Strains and gains

Release 3.0 incorporates a wealth of other new features, including an undo com-

At a glance

Lotus 1-2-3 Release 3.0

Distributor:	Lotus Development
Telephone:	(02) 287 1900
Price:	$995 (includes both DOS and OS/2 versions); network server version, $1150 plus $655 per network node; upgrade from any prior release, $260
Requires:	286 or 386-based PC, DOS 3.0 or later. DOS version requires at least 1M of extended memory in RAM; OS/2 versions requires 3M of RAM (4M recommended)
In short:	Release 3.0 offers sophisticated linking and 3-D features, visually attractive graphics, and robust links to external databases. But it's complex to use, lacking some amenities, and, without Allways, pedestrian in output. It's a good start, but it's not yet finished.

Using a graph window that can be as wide as you like, 1-2-3 Release 3.0 can show a graph on the same screen as your worksheet. Changes to the numbers or to the graph settings are reflected immediately

In the absence of any real competition for their leading accounting software, Sage now provide their own.

FREE DEMO DISK

Sage "Businesswise" intergrated accounting programs are already one of the fastest selling software packages in Australia with thousands of satisfied customers throughout the country.

S

Why then, with such a success on our hands, have we decided to launch the new Sterling range of accounting software?

In a nutshell, new Sterling offers all the elements that makes 'Businesswise' so successful, but has a lot more features and does everything quicker and more efficiently.

There are dozens of minor improvements but more importantly, some forty three major enhancements all told.

Like the context sensitive help screens that can be changed to suit individual requirements.

A

And new 'Periscope'. A major feature that allows instant access to accounts data from whichever program is being worked with at the time.

All designed to provide the small to medium sized business with all the accounting software it's ever likely to need.

G

We may, at first sight, appear to be shooting ourselves in the foot, but then if we don't knock 'Businesswise' off its pedestal, it's unlikely that anyone else will.

To find out more, simply post the coupon to the address below for your FREE DEMONSTRATION DISK.

E

For a free demonstration disk of the new Sterling range of accounting software simply post this coupon to Sage Australia, 40 Gloucester Street, The Rocks 2000.

Telephone: (02) 252 4166 Fax: (02) 251 4308.

I require 5¼" disk ☐ 3½" disk ☐

NAME

POSITION

COMPANY

ADDRESS

POSTCODE TEL

SAGE Sterling

NOW YOU'RE REALLY TALKING BUSINESS

mand and many other small enhancements. It is available in a network server version and has network controls to ensure file integrity in a multi-user environment. Its new macro learn mode and its ability to store macros on any worksheet open in memory are also welcome.

But the sheer number of new features that Release 3.0 incorporates puts a severe strain on menu logic. With over 200 new choices on the menus, the branches have grown so much that the tree may be about to fall over from its own weight. It doesn't help that some menu choices — colour, for example — mean different things in different parts of the program. The setting sheets in 2.2 go a long way towards solving this problem, and it's unfortunate that Lotus chose not to incorporate them in 3.0.

Release 3.0 offers well-implemented file-linking and 3-D features, robust external database capabilities, and much-improved graphics. But its clumsy menu structure and its limitations on high-quality output can't be ignored. Written in C for portability, it is also generally slower than 2.01 or 2.2. While die-hard 1-2-3 users may not mind, these flaws give the less committed good reasons to pass up the product.

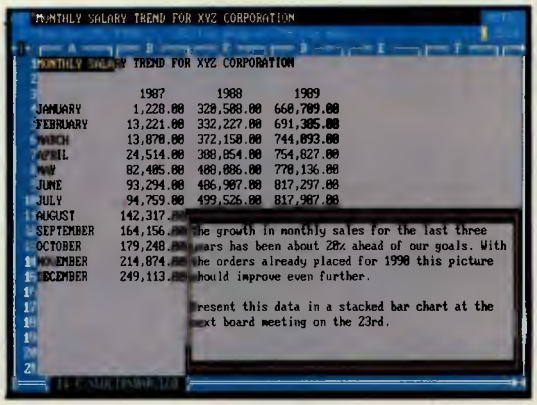
David Stone

Lucid 3-D

Working with DacEasy's Lucid 3-D is like practicing sleight of hand. A press of a hotkey brings this memory-resident software leaping to the foreground. There, you can jot down some numbers, pull in information from the application you just left, start a graph and then stuff Lucid 3-D back up your sleeve.

What makes this conjuring so impressive is that the program occupies only 140K of conventional RAM and costs a mere $220. Yet it works with up to 8M of total memory — conventional and expanded — so you'll have ample room for the nine windows you're allowed to open, even when they contain large and complex worksheets.

By default, Lucid (which can be run as a standalone application) gives you a 63K work area, but you can allocate as much or as little memory as you want by using the /K parameter at the DOS prompt. Command line parameters control whether you load the graphics and file-translation utilities, as well as letting you edit the configuration file, load a macro or unload the program. While all this is a little awkward, it does help conserve RAM while customising Lucid to your needs.


MONTHLY SALARY TREND FOR XYZ CORPORATION
1987 1988 1989
JANUARY 1,228.00 328,588.00 668,789.00
FEBRUARY 13,221.00 332,227.00 691,305.00
MARCH 13,878.00 372,158.00 744,893.00
APRIL 24,514.00 388,854.00 754,827.00
MAY 82,485.00 488,886.00 770,136.00
JUNE 93,294.00 486,987.00 817,297.00
JULY 94,759.00 499,526.00 817,987.00
AUGUST 142,317.00
SEPTEMBER 164,156.00
OCTOBER 179,248.00
NOVEMBER 214,874.00
DECEMBER 249,113.00
The growth in monthly sales for the last three years has been about 28% ahead of our goals. With the orders already placed for 1990 this picture should improve even further.
Present this data in a stacked bar chart at the next board meeting on the 23rd.

Lucid 3-D's useful notepad lets you attach a note up to 16K in length to any cell, or reference any ASCII text file on disk. You can size and move the notepad window just like any other Lucid window

'. . . its pleasing design and wealth of capabilities, not to mention its low price, make the program quite a bargain.'

Pellucid Lucid

The interface in Lucid resembles its name: it's clear, thoughtful and appealing. The worksheet windows can be resized, moved, zoomed or split into simultaneously scrolling halves. Lucid 3-D's well-designed stacking menus can be invoked either with the F10 key or, like 1-2-3, with the slash key. The program's excellent mouse support makes your work even easier; window controls and the pop-up calculator are represented by icons, and you can mark ranges, scroll, turn switches and leap across the sheet without touching the keyboard. You can even enter letters and numbers with a mouse if you're willing to pick them one by one from a pop-up label box.

Lucid's cleverly designed clipboard not only lets you copy and move ranges or save them into separate files, but also allows you to copy them to and from an underlying program. A notepad that holds up to 16K of text (about eight pages) lets you attach memos or disk-based note files to individual cells. The notepad window can be resized or moved, and you can set margins, number pages, and add headers and footers to your notes.

While not a true 3-D spreadsheet, Lucid is adept at creating links between worksheets. This lets you break your models into manageable chunks and also helps you avoid the 254-column limit. Lucid can link both individual cells and ranges between worksheets. When the cursor is on a linked cell, the grey Plus and Minus keys let you move back and forth

At a glance

Lucid 3-D

Distributor:	Peripheral Systems
Telephone:	(02) 437 6255
Price:	$220; upgrade from any previous version, $65
Requires:	386K of RAM, two disk drives (512K and hard disk recommended), DOS 2.1 or later. Mouse optional
In short:	Capable of running either standalone or memory resident, Lucid 3-D offers a clean, easy-to-use windowing interface with terrific mouse support, plus good macros, speedy performance and nice graphics — all at a very low price. It's not as powerful as many of its competitors, especially when it comes to formulas, but it's an unbeatable bargain if your needs are modest.

New Sky Software. Tell us how you'd like it fashioned and we'll do the rest.

If you were after a tailor-made suit, would you honestly want to go to an off-the-peg outfitter?

We think not.

Yet when you go out to buy a software system, that's exactly the situation you're faced with.

Or at least you were until now.

S

SkyMaster 4 is Sky's brand new accounting system. And it's really got the measure of the competition.

It's written in SkyBase 4. Our own fourth generation language.

Which means it's more powerful, more concise and more importantly, more easily understood, than any generation before it.

So, whatever peculiarities your business may demand, Sky can accommodate them.

K

And when demands change and your business grows, the simplicity of the SkyBase language means it can be very easily updated.

(Something that clearly impressed 'Which Computer?' magazine and moved them to vote new SkyMaster 4 'Best Buy' in a recent survey of accounting programs.)

It all adds up to one of the first accounting systems that really can be tailored to the needs of your business.

Y

All you have to do is tell your local Sky Development Centre exactly what you want, and he'll fashion the program accordingly.

To find out more, post the coupon to the address below.

You'll have your software needs all sewn-up by a very simple snip of the scissors.

SKY SOFTWARE, 40 Gloucester Street, The Rocks 2000. Telephone: (02) 252 4166. Fax: (02) 251 4308.

Please send me full details of SKYBASE 4 ☐

SKYMASTER 4 ☐
(tick boxes)

NAME _____

COMPANY _____

ADDRESS _____

_____

POSTCODE _____

TELEPHONE _____

SKY

NEW GENERATION SOFTWARE

NOW YOU'RE REALLY TALKING BUSINESS

A member of The Sage Group

File-linking spreadsheets: summary of features

continued from page 81

	Lucid 3-D	SuperCalc5	PlanPerfect	Quattro Pro	Microsoft Excel	Lotus 1-2-3 Release 2.2	Lotus 1-2-3 Release 3.0
Database features							
Search-and-replace	●	●	●	●	●	●	●
Sorts by row/column	●/●	●/●	●/●	●/○	●/●	○/●	○/●
Number of sort keys	2	3	10	5	3	2	255
Searches by arithmetic/logical criteria	○/○	●/●	●/●	●/●	●/●	●/●	●/●
Joins two database tables	○	○	●	○	○	○	●
Multi-dimensional database (number of levels)	○	○	○	● (64)	○	○	● (256)
Queries external databases	○	○	○	●	○	○	●
Reads from and writes to external databases	○	○	○	● (dBASE, Paradox, Reflex)	○	○	● (dBASE)
Macros							
Macros in worksheet/library	○/●	●/●	●/●	●/●	●/○	●/●	●/●
Auto-load/auto-close macros	●/○	●/○	●/○	●/○	●/●	●/○	●/○
Event-driven macros	●	○	●	●	●	●	●
Macro libraries provided	●	●	●	●	●	○	○
Macros can execute DOS commands	●	●	○	○	●	●	●
Imports working Lotus macros	○	●	●	●	●	●	●
Macro recorder	●	●	●	●	●	●	○
Single-step trace mode	●	●	●	●	●	●	○
Macro debugger	○	●	○	●	●	○	○
Auditing features							
Allows notes on formulas	●	●	●	●	●	○	●
Map mode	○	●	○	●	●	○	●
Shows formula dependencies	●	●	○	○	●	○	○
Shows circular references	●	●	●	●	●	●	●
Graphing features							
Graph types:							
Bar (2-D/3-D)	●/●	●/○	●/○	●/○	●/○	●/○	●/○
Line	●	●	●	●	●	●	●
Pie	●/○	●/●	●/○	●/○	●/○	●/○	●/○
Hi-lo-open-close	●	○	●	●	○	○	●
Scattergram	○	○	●	●	○	○	○
Views graphs in colour	○	●	●	●	●	●	●
Views graphs with worksheet	○	○	○	●	●	●*	●
Annotates graphs with text	○	○	●	●	●	○	○
Customises graphs with freehand drawing	○	○	○	●	○	○	○
Imports clip art (formats)	○	○	○	● (.CLP)	○	○	○
Printing features							
WYSIWYG preview	○	●	●	●	●	●	○

● — Yes ○ — No * With *Allways* installed

Continued . . .

	Enable/OA	Framework III	SmartWare II
	○	●	● (search only)
	●/●	●/○	●/●
	8	1	16
	●/●	●/●	○/○
	○	○	○
	● (unlimited)	○	○
	○	●	○
	● (Enable)	● (dBASE)	○
	●/●	●/●	○/●
	●/○	●/●	●/○
	○	●	○
	○	●	●
	●	●	●
	●	○	○
	●	○	●
	●	○	●
	○	●	●
	○	●	●
	●	○	●
	●	○	●
	○	●	●
	●/○	●/○	●/●
	●	●	●
	●/○	●/○	●/●
	●	●	●
	●	●	●
	●	○	●
	●	●	○
	○	●	○
	○	○	○
	○	○	○
	○	○	○

continued on page 94

between the worksheets with ease. The program also directly reads and writes DacEasy Accounting files.

Powerful macros and graphics

Lucid's macros are quite powerful. You can record your keystrokes to build macros, or write and edit them in the notepad and then compile them. Macros use English-like phrases and can be nested up to 10 levels deep. You can also define your own functions, each with up to nine arguments.

The graphics module, which must be loaded separately, is another one of the joys of Lucid. You can view most of the 10 basic graph types — bar, pie and so forth — horizontally as well as vertically; since you can also switch rows and columns, you have a total of 37 different views. Creating and modifying graphs is extremely easy. Data labels are generated automatically, and you have good flexibility in the placement of headers, footers and custom legends.

Lucid has no database functions and isn't completely compatible with 1-2-3 (it won't, for instance, read or write Lotus macros). But its pleasing design and wealth of capabilities, not to mention its low price, make the program quite a bargain. Unconventional though it may be, it is an excellent choice.

Henry Fersko-Weiss

Microsoft Excel

If we are really entering a new, graphical age, Microsoft would certainly like the dominant spreadsheet to be Excel, which might not be a bad thing. With solid spreadsheet and charting components and a comprehensive macro language integrated into a powerful graphical environment, Excel is no more 'just a spreadsheet' than a Ferrari or a Porsche is 'just a car'.

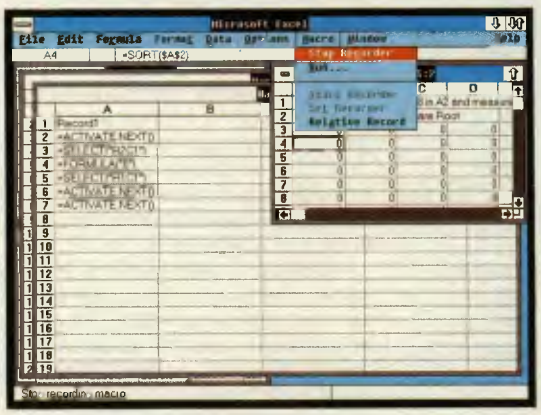
Excel comes in versions for Microsoft Windows and for the OS/2 Presentation Manager (each sells for $835), as well as

for the Macintosh. With the exception of a data consolidation feature for grouping dissimilar ranges in the OS/2 version, there is little functional difference between the two PC versions, and all three versions are file compatible — a unique advantage for mixed-platform installations. Microsoft claims that the OS/2 version has some advantage in speed, but if this is true, much of it seems to be absorbed by the OS/2 dreadnought. The common user interface and command structure makes migration a painless trip, but it's a pity that Microsoft did not take better advantage of OS/2's multi-threading and background processing features to boost performance, as did Aldus with PageMaker for Presentation Manager.

More than a pretty face

Beyond its visual trappings, Excel is a rather typical spreadsheet, though one with enough statistical and mathematical functions to rival or outdo nearly all of its competitors. But the rich functionality of its graphical environment helps a great deal in overcoming the tedious side of spreadsheet work. Copying the contents of a range of cells to another range, for instance, is no more complex than selecting the origin and destination cells and pressing a few keys. To mark a range, you simply click on the cell where you want it to begin, hold down the shift key and then click again where you want it to end.

Granted, if you are new to Windows, your first few Excel sessions may be spent awkwardly clutching the mouse with one



Microsoft Excel's macro functions use the same notation as the program's standard functions. A macro recorder lets you capture your activities to a macro sheet to be replayed or modified later

hand, stabbing at menus and options, as you timidly enter data with the other. But with practice and repetition, the rational key assignments in Excel's SAA-compliant menus will let you concentrate on the work at hand.

Excel's file-linking capabilities aren't as flexible as the 3-D schemes of some of its competitors. While Excel is less adept at consolidating similar worksheets than is 1-2-3, Release 3.0, its multi-window graphical environment makes this distinction almost irrelevant in many instances, especially when the worksheets are dissimilar. Linking cells and ranges becomes simpler when you can point at them with the mouse, and you can group interrelated spreadsheets together in a workspace that can be saved and then retrieved as a unit.

As with its spreadsheet features, the real strength of Excel's database functions lies not only in their intrinsic power but in their integration. You don't fully realise the strength of the Extract function, for example, until you need to create separate reports to describe various aspects of a larger master sheet. Rather than forcing you to manipulate a sizable document and then define the formatting parameters for a limited area, Excel lets you simply extract the data into a new sheet. If you choose to retain the new information as linked formulas, your updates to the master sheet will be reflected in the subsidiary sheets.

Auditing is another one of Excel's strong points. You can create a note for each cell in order to document its origins or functions, and the program's Show Info option displays the formulas, dependencies and notes for the currently selected cell. You can print the notes with the worksheet if you choose.

Charting your data

Purists will certainly contest Microsoft's use of the word 'charts' as a description of Excel's graphing facilities. But even though these facilities lack the advanced features of a dedicated charting package, they are sufficient to satisfy most spreadsheet users. A variety of graphic types are available through the Gallery menu, running the gamut from simple line charts to pie, bar and column charts and to scattergrams. You can use as many sets in a single graph as visual clarity will permit. Your graphs can also be enhanced with resizable arrows, and text labels are available in the full range of typefaces that Excel supports.

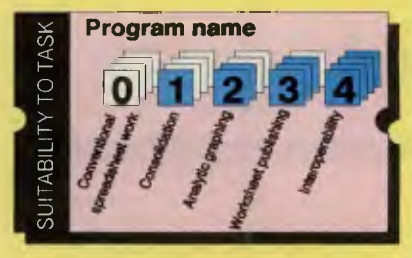
At a glance

Microsoft Excel

Distributor:	Microsoft
Telephone:	(02) 452 0288
Price:	Windows or OS/2 version, $835. Upgrade from Windows version to OS/2, $130; upgrade from any previous Windows version, $60. Network licence (Windows version only): server and one node, $835
Requires:	Excel for Windows: 640K RAM, Microsoft Windows 2.1 or later, or DOS 3.0 or later. Excel for OS/2: 2.5M RAM, OS/2 1.1 or later, 286 or 386-based PC. Hard disk required; mouse recommended
In short:	Though it's no longer miles out in front of the competition, Microsoft Excel is still one of the best spreadsheets on the market. Full-featured spreadsheet, database and charting functions buttressed by a powerful macro language and superb publishing support, all closely integrated in the Windows environment, make it an excellent choice for high-end and mission-critical uses.

File-linking spreadsheets: suitability to task

With the definition of spreadsheet work expanding far beyond simple number-crunching, more than ever you must choose your spreadsheet according to the jobs you'll require it to do. The informed subjective ratings below can help you toward this goal. Compare them with the product reviews, the features table and the performance tests for a complete picture of what each product offers.



The tasks

Each spreadsheet program is rated according to its usefulness in five areas. The first rating, **Conventional Spreadsheet Work**, evaluates the product for the bread-and-butter tasks a spreadsheet is called upon to do. It is based on the number and richness of commands and functions; the extent of the program's macro language; special features such as auditing; and performance and memory usage.

The second measure, **Consolidation**, reflects the ease with which the product handles this very common spreadsheet task. True 3-D packages have the upper hand in this category, but the score for a file-linking spreadsheet indicates how easy it is to make the links and whether you can group files together in memory or on-disk.

The third, **Analytic Graphing**, is a measure of the product's ability to help you turn your numbers into pictures. The score depends on the number and strength of the program's graphing features, as well as its facilities for customising, annotating and viewing your graphs. This category is focused on analysis, not presentation.

The quality of the printed graph is evaluated as part of the fourth category, **Worksheet Publishing**, which also takes into account the program's font support, its ability to dress up worksheets with boxes, lines and shading, and the clip art it can import. The ability to integrate graphs and worksheets on the same page is also an important factor in the publishing measure.

The final category, **Interoperability**, is a broad measure of how well the program works with other applications and other platforms. Support for hot or warm links with other applications such as communications programs and word processors is important, as is the ability to query and write to external database files directly. Naturally, spreadsheets that are part of integrated programs do well on this measure. Also figuring into the mix is the ease with which you can exchange data, formulas and macros in an environment that may include Macintoshes as well as DOS and OS/2 PCs. The best in this regard are those spreadsheets whose files are compatible with versions running on other platforms.

The ratings

0 – Completely unsuited
1 – Poor
2 – Good
3 – Very good
4 – Excellent for the task

FROM AMSTRAD, A CHANCE TO CLINCH THE PERFECT COMPUTER DEAL.

INDUSTRY STANDARD COMPATIBLE

For serious home users, the days of frustration are over.

You see, Amstrad have just released the new PC1640H computer package, designed specifically with the serious home user in mind.

The package features the fast 8MHz, IBM-XT* compatible, 640K RAM, PC1640 personal computer. But that is just the start.

The system includes a 30Mb hard disk drive, a full-size keyboard, parallel and serial ports, MS-DOS 3.2 operating system, two-button mouse, high resolution, EGA colour monitor, a 5¼" floppy disk drive and a complete system manual.

All this for the price you'd expect to pay for an ordinary home computer. Not only that, but they're throwing in over $1000 worth of extras, for absolutely no extra.

There's the SuperCalc spreadsheet package, Tracker database package, the popular word-processing program, Wordstar and the Intouch tutorial package which shows you how to get the most out of the MS-DOS operating system.

And if you need a break from the serious work, take time out with the 'PC Challenge' pack of four state-of-the-art computer games.

Added to that, there's also a free, three-hour, introductory training course with leading business colleges in all mainland State capital cities, to help you further hone your personal computing skills.

But please do not take this offer lightly.

See your Amstrad dealer and tell him you want to do serious business on a home computer.

$2499 RRP

AMSTRAD

For the price, you get the works.

Available from Myer, Grace Bros and Amstrad Dealers.

All prices shown are RRP at time of print and are subject to change without notice. *IBM is the registered trademark of IBM Corporation. Amstrad name and logo are trademarks of Amstrad Plc 1989 Amstrad Pty Ltd.
PC Challenge requires colour monitor to work

A.P.C.

Conroy Partners/AMS1563(NAT)

Because Excel runs under Windows, importing data into a graph involves simply copying and then pasting the selected ranges into the Windows Clipboard. Graphs can be overlapped in the order they are imported and you can change this order to bring background values to the forefront whenever you need to.

Excel is justly renowned for its outstanding worksheet publishing facilities, though with the advent of Quattro Pro it's no longer alone in this regard. Credit for this actually goes to Windows for its extremely flexible printer and font support, but Excel borrows handily from them. Portrait or landscape printing is no more complicated than making a selection from the printer setup menu, while its preview mode (with full-page zoom) helps ensure that your final output is what you intended it to be.

Programming agility

Few spreadsheets offer you as complete a programming language as Excel. Excel's macro language goes well beyond the simple manipulation of spreadsheet functions, allowing you to create fully functional applications complete with modifier menus and restricted data-entry types.

While macros are traditionally cryptic and difficult to learn, Excel's macro commands logically follow its menu functions. Its excellent macro recorder will furnish you with a functioning transcript of anything you do in the program — a major help when you're automating repetitive tasks. Because Excel maintains a separate macro sheet, editing is simpler than if it were mixed with live data; you use the cutting and pasting facilities available throughout the program.

You can even create custom functions, defining simple or complex data processes in a series of formulas whose complexities are embedded in the macros. Excel appends these macros to its list of functions; to use one, you simply supply the function name and its list of arguments, just as you would with one of Excel's predefined functions.

Excel's graphics environment does impose a slight penalty in speed and its system demands are substantial: although Microsoft recommends only an AT-class machine, a 20MHz or faster computer with 2M (for Windows) or 4M (for OS/2) is preferred. But Excel's agility at handling the multiplicity of day-to-day spreadsheet problems may make it the fastest way to get your work done. Obviously, Excel is not the product to use on a low-end system, but if your spreadsheet demands are great, it may be your best choice.

Bill O'Brien

ABS: ACCOUNTING & BUSINESS MANAGEMENT SYSTEMS

ABS: Systems offers a full suite of modifiable accounting and business management modules to those wishing to improve the efficiencies of their internal procedures. These modules provide the superior advantages of Advanced Revelation, one of the worlds best relational database management platforms making them truly user friendly. The complex tasks of buying, selling, financial and analytical reporting are all made easy with ABS: systems. Simply, they help to make the day to day running of your business so much easier.

AUSTRALIAN
Designed and developed for Australian conditions by a team of experienced businessmen, accountants, professionals, and computer programmers.

ADVANCED REVELATION
Developed entirely in this fourth generation language, and fully compatible with MS-DOS, Concurrent DOS, System Manager and all popular networks.

MODIFIABLE WITH SOURCE CODE
Each module is able to be modified by either the authors or experienced developers as we include with every system our program source code.

FAST, EFFICIENT, SIMPLE TO USE
Extensive on-line help, comprehensive and easy read documentation, partial name lookup, popup screen listings, ability to pause one job and start another, form and report generators, background printing, ad-hoc query capability and only 3 essential function keys. These are just some of the many superb features found in all ABS: modules.

MULTI-USER
Each single user ABS: system can be easily converted into a multi-user system with proven file and record locking techniques.

MODULAR
Excluding illogical combinations you may select which modules to buy initially and at any time later be able to add other modules as your needs demand.

The ABS: range consists of;

ABS: SYSTEM
ABS: RECEIVABLES
ABS: PAYABLES
ABS: LEDGER
ABS: INVENTORY
ABS: PURCHASING
ABS: SELLING
ABS: SERVICE
ABS: IMPORT
ABS: PROJECT
ABS: PAYROLL
ABS: NETWORK

ABS: PRODUCTION *
ABS: ASSET *

* DUE FOR RELEASE EARLY 1990

ASK FOR FURTHER INFORMATION ON THESE OUTSTANDING SYSTEMS.

ABS: SYSTEMS

Level 2 Cnr Stoddart Road & Church Lane Prospect • A Unit of Caraga Holdings Pty. Ltd.
• PO Box 726 Blacktown NSW 2148 • Facsimile (02) 688 3995 • Telephone (02) 631 0922

PlanPerfect

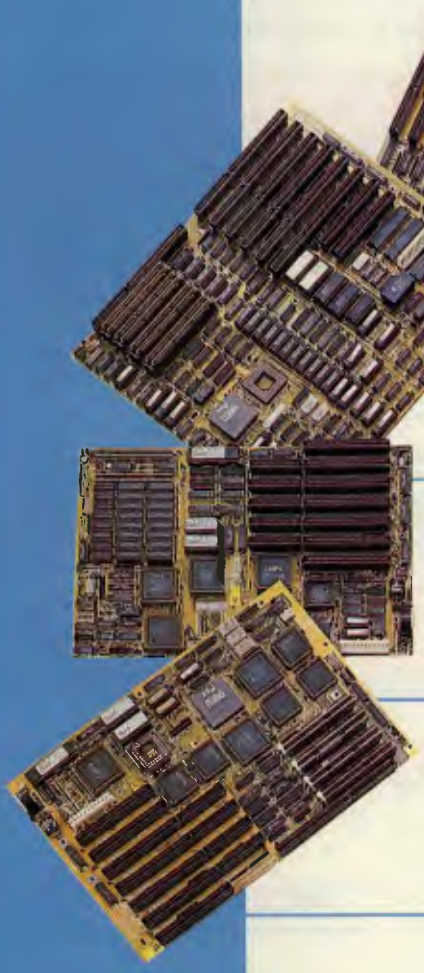
Though overshadowed by its more celebrated cousin, WordPerfect's PlanPerfect may well be almost as good a spreadsheet as WordPerfect is a word processor. The $715 program is as feature-rich as 1-2-3 but also works comfortably with WordPerfect, sports admirable graphics printing facilities and has the significant advantage of WordPerfect's universally esteemed product support.

PlanPerfect admirably juggles its three interfaces. WordPerfect users will find PlanPerfect's command interface familiar: both use similar function-key combinations. Yet Lotus users will find that most (though not all) of the familiar 1-2-3 command sequences work. And anyone crossing over from programs with single-key horizontal or pull-down menus should also find it easy to get used to.

PlanPerfect's 2-D worksheets can be linked in memory or on disk through file-linking expressions stored in the destination worksheet. The program can be configured to update the links automatically whenever you load the destination

FROM 486, CACHE-386 TO BABY-286 MAIN BOARDS & SYSTEMS.

WE SUPPORT YOU A FULL-RANGE PRODUCTS



MS4102
25MHz 80486 M/B
-80486-25 CPU
-8K Internal cache
-64k second level cache on board
-2M/8M DIP RAM on board,
8M on RAM card. Expandable to 16M
-Shadow RAM feature

MS3105
25MHz cache-386 M/B
-80386-25 CPU
-64K cache memory
-Landmark test = 42

MS-3110
33MHz Cache-386 M/B
-80386-33 CPU
-80387/Weitek 3167 Socket ready
-Landmark test = 57

MS3109M
16/20MHz Baby-386SX M/B
-80386SX-16/20 CPU
-Support EMS function
-Landmark test = 24.5

MS-2115M
12 MHz Baby 286 M/B
-80286-12 CPU
-"VLSI" Chip-sets
-Surface mouniting technology
-Landmark test = 15.9

MS3103M
25MHz Baby-386M/B
-80386-20/25 CPU
-2M/8M SIP RAM-Module
on board
-Landmark test = 34.5

MS1407A
VGA Card
-Paradise Chip-sets
-800 x 600, 256k to 512K RAM
-1024 x 768 now available

MICRO STAR INTERNATIONAL CO., LTD.

7FL., NO. 4, LANE 497, CHUNG CHENG RD,
HSIN TIEN CITY, TAIPEI HSIEN,
TAIWAN, R.O.C.
TEL: 886-2-917-5292
FAX: 886-2-917-5552 / 917-6049
TLX: 35493 MICOSTAR

MS-9000
CACHE-386 SYSTEM

MS-7000 BABY-286 SYSTEM

MS-6000
386SX SYSTEM

MICRO SALES
PERSONAL COMPUTING FOR BUSINESS

Quality hardware and software in quantity. Professionally backed with post-sale support. Call (02) 281 3377 or (03) 525 4566 for any product not listed.

HARDWARE

HARD DISC (inc. tax)

Bernoulli Box	Call
Control Data 40MB V/Coil	825.00
Control Data 320MB ESDI	Call
Connor 110 MB AT	1390.00
Seagate 20MB W/Cont.	485.00
Hardcard 80	1475.00
Xyxis Optical Drives	Call

PC ENHANCEMENTS

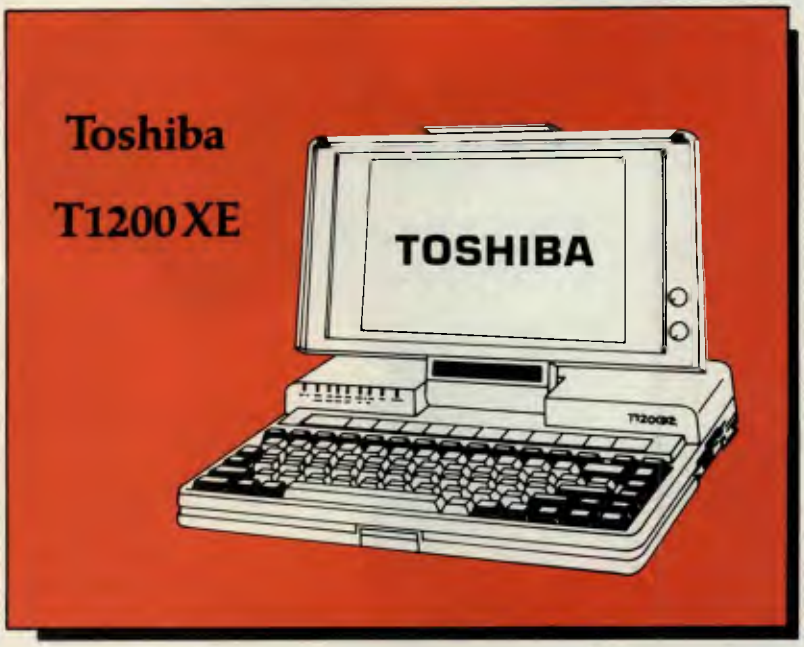
80287/8	390.00
80287/10	450.00
80387SX	675.00
80387/16	685.00
80387/20	790.00
80387/25	999.00
Intel Above Board Plus 2MB	1125.00
Hyperace 286 Plus	499.00
Hyperam 286 2 MB	995.00
Hyper 386 SX	795.00

MODEMS (inc. tax)

Automodem 1234	579.00
Automodem 24/24	475.00
PC In/modem 1234	529.00
PC In/modem 2400	450.00
Pocket Modem 1234	520.00
Smart M4 1234SA	995.00
Smart M5 12345SA	1895.00
Smart 123 SA	595.00
Smart 1234 SA	759.00
Smart 2400 SA	669.00

LAPTOPS (inc. tax)

Toshiba – full range. Call for pricing.
FREE carrybag!



MONITORS (inc. tax)

ECM VGA	649.00
ECM EGA	649.00
NEC Multisync 2A	750.00
NEC Multisync 3D	995.00
NEC Multisync 4D	2350.00
NEC Multisync 5D	3490.00

VIDEO CARDS (inc. tax)

Vega VGA Card	399.00
Vega VRAM	1099.00
Video 7 1024i	595.00
AST VGA Plus	499.00

LAN PRODUCTS

Lanspool	899.00
Lanspace	1390.00
WD-Ethercard Plus	390.00
G/Ethernet	585.00
Netware 286 & 386	Call

PRINTERS (inc. tax)

Toshiba PageLaser 12	Call
Epson LQ850	875.00
Epson SQ2550	Call
NEC P5300	1325.00
NEC P9	2350.00
OKI Microline	Call
National KPX1124	647.00
Roland DXY-1300 Plotter	Call
Star NX1000	449.00
Toshiba P341SL	Call
Toshiba P351SX	Call
Toshiba Page Laser 6	2350.00
Xerox 4020 Inkjet	2695.00
Toshiba Express Writer	Call

Hyper 386 SX $795
Harvard Graphics $485
Word Perfect V5.1 $539

AUSTRALIAN COMPUTER DEALERS' ASSOCIATION MEMBER

SOFTWARE

GRAPHICS

Harvard Graphics	485.00
Lotus Freelance Plus	645.00
Gem Draw Plus	385.00
Ventura (inc. Ventutor)	1090.00
Pagemaker	1325.00
Auto Sketch	249.00
Generic Cadd Level 3+	599.00
Autodesk Animator	399.00

COMMUNICATIONS

Carbon Copy Plus	180.00
Crosstalk XVI	199.00
Gateway Version 3.15	145.00
SmarTerm 240	460.00
Supercom 3 Executive	159.00

WORDPERFECT

Wordperfect 5.1	539.00
Wordperfect Office	Call
PlanPerfect 5.0	595.00
DrawPartner	Call
Wordperfect Executive	355.00

DATABASES

Clipper Compiler V5	Call
DBase IV	890.00
DBXL 1.3	325.00
FoxBase Plus 2.1 S/User	575.00
Isys	475.00
Paradox 3	760.00
Paradox 386	795.00
R:BASE	Call

SPREADSHEETS

Lotus 1-2-3	Call
SuperCalc 5	595.00
Microsoft Excel	570.00
Quattro Pro	599.00

MICROSOFT

Microsoft Excel	570.00
Microsoft Flight Simulator 4.0	79.00
Microsoft Mouse	205.00
Microsoft Quick Basic/Quick C	130.00
Microsoft Word for Windows	525.00
Microsoft Windows 286	135.00
Microsoft Windows 386	249.00
Microsoft Word	455.00
Microsoft Works	205.00
Microsoft Project	525.00

PC SOFTWARE

Laplink III	175.00
Borland Range	Call
Desqview 386	299.00
Norton Backup	215.00
Fastback Plus	195.00
Harvard Project Manager	799.00
Norton Commander Ver. 3.0	195.00
Norton Editor	90.00
Norton Utilities Advanced	145.00
PC Tools Deluxe Ver. 5.5	Call
Print Q	149.00
Timeline Ver 4.0	815.00
Typing Instructor II	99.00
Xtree Network	395.00
Xtree Pro Gold	165.00
Framework III	825.00
Formtool	220.00

WORD PROCESSING

Word Perfect 5.1	539.00
Multimate Advantage IV	640.00
Lotus Manuscript	Call
Wordstar 2000+ Ref. 3.0	379.00
Wordstar Prof. Ver. 5	379.00
XYWrite	490.00
AMI Professional	650.00

MICRO SALES

Level 1, 579 Harris St, Ultimo 2007. Tel: (02) 281 3377. Fax: (02) 281 3920
212 St Kilda Road, St Kilda 3182. Tel: (03) 525 4566. Fax: (03) 525 4646

Orders, quotes or information
Call our Sales Department now on

(02) 281 3377

(03) 525 4566

Or mail or fax the coupon.
Guaranteed 24-hour response.
Fax (02) 281 3920
Fax (03) 525 4646

E. & O. E. Prices subject to change

Micro Sales
Level 1, 579 Harris Street, Ultimo 2007
212 St Kilda Road, St Kilda 3182
Please forward information by phone/fax/mail today. I am interested in:
Computers ☐ Terminals ☐
Screens ☐ Software ☐ Other ☐

Mr/Ms _____
First Name Last Name

Company _____

Position _____

Phone ( ) _____

Fax ( ) _____

Address _____

_____ Post Code _____

STRONG MIC5354MAPC

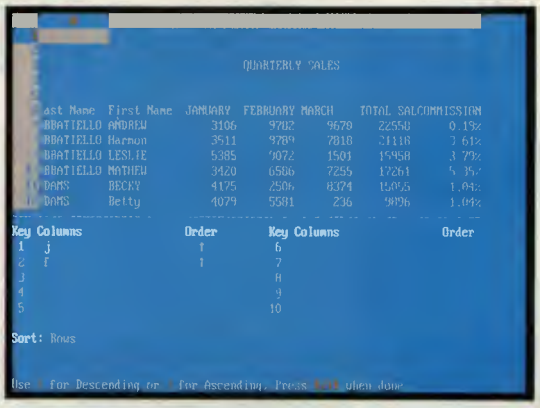
File-linking spreadsheets: summary of features

continued from page 87

	Lucid 3-D	SuperCalc5	PlanPerfect	Quattro Pro	Microsoft Excel	Lotus 1-2-3 Release 2.2	Lotus 1-2-3 Release 3.0
Prints text and graphics together	●	○	○	●	●	●	●
Landscape printing	●	●	●	●	●	●	●
Boxes and shading	○	●	○	●	●	●	○
Multiple fonts	○	●	●	●	●	●	○
PostScript support (text/graphics/combined)	○/○/○	●/●/○	●/●/●	○/○/●	●/●/●	●/●/●	●/●/●
Number of printers supported	185	150	450	163	Any Windows or PM printer	84 (70*)	38
Customisable print drivers	○	●	●	○	○	○	○
Plotter support	○	●	●	●	●	●	●
Background printing	○	○	●	○	●	○	●
Multi-line headers and footers	●	●	○	○	○	○	○
Colour printing	●	● (graphics only)	●	●	●	●	●
Import/export							
Lotus 1.x (.WKS)	●/●	●/●	●/●	●/●	●/●	●/●	●/○
Lotus 2.x (.WK1)	●/●	●/●	●/●	●/●	●/●	●/●	●/●
Lotus 3.0 (.WK3)	○/○	○/○	○/○	○/○	○/○	○/○	●/●
Symphony	●/●	○/○	○/○	●/●	●/○	●/●	●/○
Multiplan (.SLK)	○/○	○/○	○/○	○/○	●/●	●/○	●/○
.DIF	○/○	●/○	●/●	○/○	●/●	●/●	●/●
dBASE (.DBF)	●/●	●/●	●/●	●/●	●/●	●/●	●/●
ASCII print files	●/●	●/●	○/○	●/●	○/●	●/●	●/●
Delimited ASCII files	●/●	●/●	○/○	●/●	●/●	●/●	●/●
.CSV files	○/○	●/●	●/●	●/○	○/○	○/○	●/○
Lotus .PIC	○/○	○/○	○/○	○/●	●/○	●/●	●/○
Other	DacEasy	XDIF	User-definable	Quattro, Reflex, Surpass	None	None	None
Lotus 1-2-3 compatibility							
Writes .WK1 files directly	○	●	○	●	●	●	○
Fully compatible with 1-2-3 macros	○	●	●	○	●	○	○
Has 1-2-3-compatible menu tree	○	●	●	●	○	●	●
Documentation							
Quick Start booklet	○	●	●	●	●	●	●
Keyboard template	●	●	●	●	●	●	●
Reference card	○	●	●	●	●	●	●
Toll-free number for free support	○	○	●	○	●	●	●
Tutorial program available	○	●	●	●	●	○	○
Tutorial booklet available	●	●	●	●	●	●	●
Index	●	●	●	●	●	●	●
Command table	○	●	●	●	●	●	●
Context-sensitive help	●	●	●	●	●	●	●

● — Yes ○ — No * With *Allways* installed

Ends.	Enable/OA	Framework III	SmartWare II
	○	●	○
	●	●	●
	●	○	○
	●	●	●
	○/●/●	●/●/●	○/●/●
	427	100	150
	○	●	●
	●	●	●
	●	●	○
	○	●	●
	●	●	●
	●/●	●/●	●/●
	●/●	●/●	●/●
	○/○	○/○	○/○
	●/○	○/○	○/○
	○/○	○/○	●/○
	●/●	●/○	●/○
	●/●	●/●	●/●
	○/○	●/●	○/○
	●/●	●/●	●/●
	○/○	●/●	○/○
	○/○	○/○	○/○
	SuperCalc3	None	CGM
	●	○	●
	○	○	○
	○	○	○
	●	●	●
	●	●	○
	●	○	●
	○	○	○
	●	●	●
	●	●	●
	●	●	●
	●	●	●
	●	●	●


QUARTERLY SALES
Last Name First Name JANUARY FEBRUARY MARCH TOTAL SALCOMMISSION
ABBATIELLO ANDREW 3106 9702 9670 22558 0.19%
ABBATIELLO Harmon 3611 9789 7818 21118 3.61%
ABBATIELLO LESLIE 5385 9072 1501 15958 3.79%
ABBATIELLO MATHEW 3420 6586 7255 17261 5.35%
DAMS BECKY 4175 2506 8374 15055 1.04%
DAMS Betty 4079 5581 236 9896 1.04%
Key Columns Order Key Columns Order
1 j 1 6
2 f 1 7
3 8
4 9
5 10
Sort: Rows
Use - for Descending or + for Ascending; Press F10 when done

When sorting columns or rows in PlanPerfect, you can set as many as 10 sort keys, each in ascending or descending order

file, or you can perform manual updates. You can keep two worksheets in memory at once; a clipboard makes it convenient to copy ranges from one sheet to another.

Data-handling features are adequate. You can sort by rows or columns on up to 10 keys. The Data Forms feature lets you set up a filter, and you view, extract or delete records using PlanPerfect's data querying functions. The process (which resembles but does not exactly mimic 1-2-3's), is a little awkward but otherwise functional.

You can create nine standard types of charts, including pie, bar, area, line, scatter and hi-lo, which can be decorated with a limited range of fonts. Graphs can't be displayed on the same screen with spreadsheets, but you can bring both graph and spreadsheet into a WordPerfect 5.0 document file and print them together. Even if you don't use WordPerfect, you can exercise a good deal of control over printing: PlanPerfect offers a full-page print preview mode and lets you use up to 32 fonts per spreadsheet.

At a glance

PlanPerfect

Distributor: WordPerfect Pacific
Telephone: (02) 499 1199
Price: $715
Requires: 384K of RAM (hard disk recommended), DOS 2.0 or later
In short: If you're committed to a WordPerfect environment, PlanPerfect's interface and data compatibility make it a logical choice. But it's not enough of an improvement over 1-2-3 to induce corporate users to switch, and its high price is an additional deterrent.

Perfect (?) macros

PlanPerfect supports two types of macros: cell macros, which are entered in a single worksheet; and file macros, which are saved in separate files and can be used from within any worksheet. You can use eight-character names for your macros or you can assign them to an Alt key as you do in 1-2-3 (though in the latter instance, you must be careful not to generate a conflict between cell macros and file macros). Macros can also be used to create user-defined functions.

PlanPerfect reads 1-2-3 files, bringing in the data and most of the functions with no problem. A conversion utility is supposed to handle the more demanding job of translating 1-2-3 macros, but it's not always successful. Although unrecognised macros are identified so that you can edit or replace them, this half measure is not a great time-saver. PlanPerfect can also import dBASE files, comma-separated variables and straight ASCII text files.

For pure function, PlanPerfect emerges as a fine choice in the spreadsheet arena. But its advantages over 1-2-3 aren't great enough, nor is its cost low enough, to make most corporate users choose it over Lotus' standard. It might be a good choice for offices committed to the WordPerfect environment, but not for many others.

Bruce Brown

Quattro Pro

When Borland brought over the development team responsible for Surpass, the two units joined forces to create Quattro Pro. The $750 software is a product of the modern programming era: it works equally well with a keyboard or a mouse; runs in either character or graphics mode; and supports 43-line EGA and 50-line VGA text displays. The result is a slick, capable spreadsheet that combines many of the best features of 1-2-3, Releases 2.2 and 3.0, and of Excel without exacting hefty hardware requirements or forfeiting compatibility with earlier versions of 1-2-3.

For the first time, HP DeskJet printers are making a big noise.

Prices exclude sales tax.

For the first time, Hewlett-Packard has greatly reduced the price of their HP DeskJet and HP DeskJet Plus printers.

So now you can get almost silent, laser quality printing for only $1395 from the HP DeskJet Plus printer or for as little as $995 from the HP DeskJet printer. That's at least $200 less than an ordinary Epson 24-pin dot matrix printer - which is something worth making a noise about.

Both printers have a built-in sheet feeder for greater convenience and give you sharper graphics and better quality output than a 24-pin dot matrix printer. The HP DeskJet Plus printer also has landscape ability, faster graphics and a wider selection of fonts.

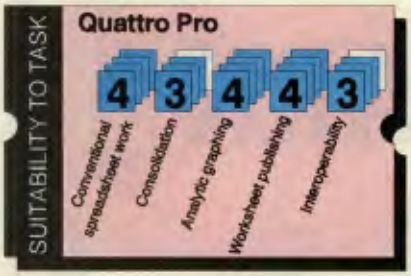
When you buy HP DeskJet or HP DeskJet Plus printers you not only save up to 30%, you also get the peace of mind from knowing your printer is backed by HP's reputation for quality, service and support. Not to mention our free three year warranty.

Contact your Hewlett-Packard dealer to find out more, or call the Customer Information Centre on 008 033 821 or Melbourne 895 2555.

HEWLETT PACKARD

Engineered for peace of mind.

1232P1007



You can choose from three user interfaces: 1-2-3, Release 2.01-style menus; menus compatible with the original Quattro; and Quattro Pro's own attractive and well-designed versions. You can switch between modes and menu systems at any time. To help you organise your work, the program contains excellent user-adaptable windows. You can open 64 files in windows at one time and, as with Excel, the windows can be sized and moved, stacked, tiled or overlapped. You can also split a single file in two, either horizontally or vertically.

Quattro Pro is strong at worksheet consolidation. Even though it doesn't offer the true 3-D capabilities of SuperCalc5 or 1-2-3, Release 3, its extensive file-linking abilities are well implemented. Wildcard file references let you link a worksheet to all open worksheets, giving you a pseudo 3-D ability to consolidate information from several sheets at once. You can save groups of worksheets in a single workspace for later use; this preserves your environment, including the position and size of all windows.

The program's function and command repertoire is large and includes several powerful tools for analysing your data. For example, the What-If command lets you see how changing one value affects the rest of the worksheet data. Powerful linear programming tools let you alter a combination of variables to achieve the best solution.

While standard database features are built into Quattro Pro, the program goes even further by working directly with external database files: Paradox, Reflex and dBASE II, III, III Plus and IV files can be queried without loading them into memory. Quattro Pro's macro support is likewise excellent; its macros are fully 1-2-3 compatible and the program comes with a superb macro debugger — a boon if you often create complex macros to build your own applications or otherwise customise your spreadsheets.

Enhancing your data

As strong as it is in the basics, Quattro Pro really shines when it comes to output. Spreadsheet publishing features are available in abundance. Bitstream fonts, included with the package, can be created on the fly; no need to spend a session building them first. Fonts can be printed in either landscape or portrait mode, and

At a glance

Quattro Pro

Distributor:	Borland Pacific
Telephone:	(02) 418 7330
Price:	$750
Requires:	512K of RAM, hard disk, DOS 2.0 or later
In short:	Borland packs a lot of power into this spreadsheet. An easy-to-use windowing interface, full 1-2-3 compatibility, strong worksheet consolidation features, the ability to view graphs and spreadsheet on the same screen, and direct access to external database files are only its most eye-catching features. Its comprehensive font support and well-rounded graphing and annotation capabilities produce beautiful output.

Two spreadsheets for OS/2

The number of spreadsheets available for OS/2 Presentation Manager is about to increase. Microsoft has had this corner of the software marketplace to itself since bringing out Microsoft Excel for OS/2 last year. 1-2-3/G was released in Australia last month, and before the end of the second quarter, these two will be matched by an impressive newcomer Wingz, from Informix Software.

With 1-2-3/G, Lotus has taken great pains to make the graphical environment palatable to its huge installed base of inveterate keyboarders, many of whom still think that the acronym GUI is more an adjective than a noun. Wingz, born on the Macintosh, is unabashedly graphic — replete with buttons, drawing tools, slide bars, handles and pickers.

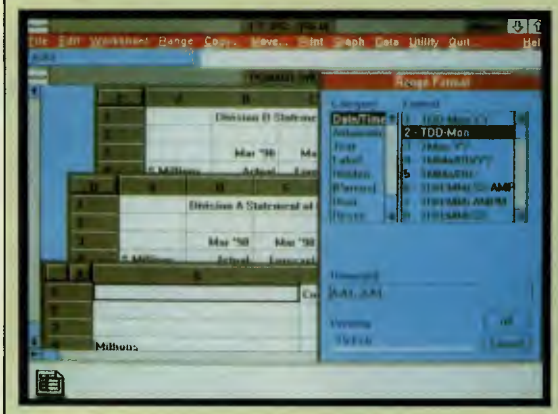
1-2-3/G is selective and conservative in its exploitation of PM's graphic potential, as if to underscore the premise that worksheets are for work. Its worksheet windows can be sized, moved, tiled, overlapped and zoomed. Text and numbers can be formatted in a variety of fonts and styles, and ranges can be boxed and shaded. But 1-2-3/G worksheets remain strictly for numbers and text: graphs reside in separate windows, as they do in Excel.

1-2-3/G offers a few graph types not available in earlier 1-2-3 releases. At last there are area graphs, as well as overlapping bars and 3-D perspective bars to set data series off from one another. Overall, however, 1-2-3/G does nothing to move Lotus from its traditional position at the back of the pack when it comes to graphing capabilities.

By contrast, Wingz is probably the most visually plastic spreadsheet environment ever created. A Wingz worksheet can not only sprout any number of graphs, but can also be adorned with pictures, geometric and freehand shapes, text fields (complete with word wrapping, tab, margin and line-spacing options), and action buttons linked to macro scripts. You can put these 'objects' anywhere you want, including on top of one another.

Wingz offers more types of graphs than you will know what to do with. Besides the customary business formats (bar, line, pie, xy, hi-lo) in the usual variations (stacked, 3-D, horizontal, combination), you get such

Continued . . .



Lotus' 1-2-3/G makes great efforts to blend the working methods of its character-based interface into the graphical Presentation Manager environment — with excellent results

COMPUTER SHARK

Free Offer!

Receive free with orders totalling $600 +

Microref Quick Reference

($35 value)

Microref titles to choose from include -

Lotus 1-2-3, MS Word, WordPerfect, Multimate Displaywrite IV, WordStar, MS-DOS.

Please complete the order form below to receive your FREE Microref Guide.

(Offer valid for one per customer per month.) Valid till June 30 1990

PRINTERS

Toshiba PageLaser6 6ppm	$2350
Toshiba P351SX	1787
Toshiba Expresswriter 311	.662
Toshiba Expresswriter 301	.574
Epson LQ2500 Plus	1995
Epson LQ1050 Plus	1230
Epson LX850	.435
Fujitsu DL2600	1400
Fujitsu DL3400	1095
Star NX 1000	.460

MONITORS

Intra High Res Green 14"	$219
ECM High Res EGA 14"	.659
ECM VGA Monitor 14"	.659

NETCOMM MODEMS

Smartmodem 1234SA	$785
Automodem 1234	.583
1234 In Modem	.555
Pocket Rocket Modem 1234	.575

PCs

Ultra XTs and ATs	Call
Toshiba Laptops	Call
Philips	Call

BOARDS

Intel Above Board Plus 2Mb	$1115
Intel Above Board Plus 512K	695
Intel Inboard 386/PC 1Mb	1395
Hyperace 286 Plus	.520
Hyperam AT 1Mb	.650
Hyperam 286 with 2Mb	.995
VEGA VGA	.399

DISKS & TAPE DRIVES

Seagate 20Mb	$382
Seagate 30Mb	.466
Seagate 40Mb (40ms)	.663
Toshiba 40Mb V/C 25ms	.795
Toshiba 72Mb V/C 25ms	1195
Colorado 40/60Mb Tape B/U	699
Col. Ext. Kit for tape B/Up	.224
Colorado PC Adaptor Kit	.179
Plus Development Passport	Call
Plus Hardcard 80Mb (19ms)	1495

EXTERNAL FLOPPY DRIVES
(Reads hi & low density disks)

5.25" & 3.5" sizes	$599

Here's a PC & software package that saves you money

ULTRA PLUS PCs with Lotus 1-2-3 & First Choice

2 Year Warranty!

Offer available with any Ultra Plus PC

Call now and discover the savings

BORLAND

Turbo Pascal V 5.5	$165
Turbo Pascal Professional	285
Turbo C Vers. 2	165
Turbo C Professional	285
Turbo Assembler/Debugger	165
Turbo Basic	119
Paradox 3.0	795
Quattro	260
Quattro Pro	650
Sidekick Plus	234

ASHTON TATE

dBase IV	$895
Multimate Advantage II	665
Framework III	870

LOTUS

Lotus 1-2-3 V2.2	$675
Lotus 1-2-3 V3	795
Lotus Agenda	519
Lotus Freelance Plus	669
Lotus Manuscript	669
Lotus Symphony V 2.0	885

MICROSOFT

Word for Windows	$530
Mouse (Bus or Serial)	210
Quick C Compiler	133
Quick Basic V 4.5	133
Project	486
Excel	579
Word	459
Windows 286	140
C Compiler	579
Flight Simulator V4	.79

GENERAL SOFTWARE

Carbon Copy Plus	$225
Clipper Compiler	759
Desqview	205
Fastback Plus	199
Formtool	189
Harvard Graphics V2	549
Mace Utilities	159
Norton Advanced 4.5	155
Norton Utilities 4.5	108
Norton Commander Vers. 3	179
Norton Backup	199
Pagemaker 3.0	1350
Paradox 3.0	795
PC Tools Deluxe Vers 6	212
PFS First Choice	189
PFS First Publisher	156
Q & A	440
Timel. Project Manag.Vers. 4	798
Tracker Plus	400
Typequick	.95
Ventura V 2.0	1152
WordPerfect V 5.1	558
WordStar Pro 5.5	385
WordStar 2000 Plus V 3.0	385
Xtree Pro	139
Xtree Pro Gold	165

Call Melbourne

(03) 241 9111 (Tel)

(03) 826 4401 (Fax)

To place orders outside Melbourne metro area

008 334 180

We accept Government purchase orders, Bankcard, Mastercard, Visa.
All prices include sales tax where applicable.

COMPUTER SHARK

52 Claremont St., South Yarra 3141

ENQUIRY/PURCHASE ORDER

❑ Place my name on your mailing list database.

❑ Preferred Microref Guide if order exceeds $600 _____

❑ I would like to order the following:

_____

Name: _____

Address: _____

_____

Telephone: _____

I enclose a ❑ Cheque for $ _____ (including $12 delivery)

Charge my Visa ❑ Mastercard ❑ Bankcard ❑

Card No: _____ Expiry date: _____

Signature: _____

Send or fax: Computer Shark P/L P.O. Box 391, South Yarra, 3141

you can dress up your reports with lines, grey or black shading and bullets. For close-up inspections, the fine-print preview feature lets you zoom to any portion of the worksheet.

As for graphics, Quattro Pro offers hi-lo, pie, stacked bar, area, line and a variety of other graph types. You can insert a graph of your data anywhere in the worksheet and as you change your data, the graph changes to reflect the new information. Printing a spreadsheet with a graph is a simple one-step process.

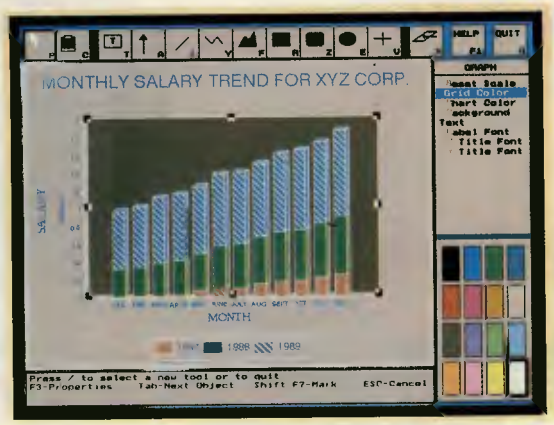
Quattro Pro's drawing capabilities set it apart from the competition. Its Annotate function provides a full-featured drawing board, with a toolbox arrayed across the top of the screen. You can enhance your graph with text, pointers and various shapes; determining element colours, line widths, object fill styles and typefaces is up to you. You can use the clip-art library included with the package to further embellish your graphs.

Most amazing of all, Borland manages to pack all this functionality into a spreadsheet package that can run on any PC and that requires only 512K of RAM. We were able to perform all *APC* benchmark tests, including our linking tests, without accessing expanded memory. For this, thank Borland's recently developed VROOMM (Virtual Real-time Object Oriented Memory Management) technology, which treats small 2 to 4K chunks of program code as objects to be swapped in and out of memory as the space is needed by worksheet data. This allows you to work with very large worksheets in a limited amount of memory.

Quattro Pro is not without its imperfections. When you preview a spreadsheet that will print in landscape mode, it appears sideways on your screen so that it's difficult to see how it really looks. You can't import third-party clip art, and both x and y-axis graph labels are treated as one element and must be formatted the same way. Most seriously, its lack of extensive auditing features will make it an inappropriate choice for those who require such capabilities.

An excellent set of manuals accompanies Quattro Pro, although this spreadsheet is so easy to use you may never need them. The compact *Quick Reference Guide* details Quattro Pro's commands as well as their 1-2-3 equivalents. With its advanced memory-management techniques, its excellent graphics and spreadsheet publishing capabilities, and its robust file-linking and database features, Quattro Pro is at the forefront of the spreadsheet pack. Easy to use, this is one spreadsheet that's actually fun to work with.

Catherine Miller



Quattro Pro is outstanding for customising graphs. In addition to changing colours, typefaces and point sizes, Quattro Pro's graph annotator lets you add customised elements (shown in the toolbox at the top of the screen) to your graphs

Two spreadsheets for OS/2

exotic species as polar, contour, surface and wireframe graphs. Want to make your worksheet look like a page from a mapbook or a quantum mechanics text? No problem.

Getting to know them

Because Wingz grew up without a thought of allegiance to the Lotus standard, it presents a face that will be completely unfamiliar to non-Macintosh users. Those who shied away from Excel because its command style was too different from Lotus 1-2-3's are not likely to be drawn to Wingz.

Users of 1-2-3, Release 2.2 and 3.0 will find that their keyboard habits serve well in 1-2-3/G. Though the menus are now SAA-compliant, they remain keystroke-compatible with the celebrated two-line system engineered by Mitch Kapor nearly a decade ago: the slash, F10 or the SAA-decreed Alt keys all work. Indeed, the biggest obstacle presented by the new interface is probably the need to invoke macros with Ctrl instead of Alt. Except for the addition of a few advanced commands for handling dialogue boxes, the macro language is identical to that of Release 3.

File linking is common to both the 2-D Wingz (whose gigantic spreadsheets can span up to 32,768 rows by 32,768 columns) and the 3-D 1-2-3/G (which allows up to 256 pages per worksheet file). With the help of DataLens drivers (supplied by Lotus as well as by third-party vendors), 1-2-3/G should eventually make powerful connections with outside data-management systems.

Although at first it may look like a simple transplant of Release 3, 1-2-3/G goes beyond that package in some important ways. In addition to borrowing a few ideas from Excel (like multiple-range selections, a Paste Special command and user-defined data formats), it offers dynamic linking to other PM programs via DDE (Dynamic Data Exchange). Lotus's technology-sharing arrangement with WordPerfect should result in easy data exchange between 1-2-3/G and the forthcoming PM version of WordPerfect.

1-2-3/G also includes an enormously powerful program called Solver. Working as a background thread, Solver solves both linear and non-linear optimisation problems involving an apparently unlimited number of variable cells and constraint formulas. Lotus says that theoretically, the complexity of the problems you can assign to Solver has no limit other than the amount of memory and time you have available.

Winging it

In addition to its graphics, the strongest attraction of Wingz is HyperScript, Informix's own English-like programming language. A much more ambitious programming system than any other spreadsheet's macro language, HyperScript includes nearly a thousand statements and functions for manipulating every logical, visual and aural aspect of Wingz. It also allows you to link in C routines for even greater flexibility. HyperScript comes with its own editor and compiler — and a separate manual that's larger than the spreadsheet reference.

While Wingz reads and writes .WK1 files, it claims no further 1-2-3 compatibility. Without great prospects for seducing the long-time Lotus devotee, Informix hopes to woo a different breed of spreadsheet user — one who values presentation and programmability above all else.

If and when the Great Migration to OS/2 begins in earnest, Microsoft will find itself ably challenged on two distinct fronts. The buttoned-down spreadsheet user may find 1-2-3/G easier to use, while the adventurous and graphics-minded may decide there's more to work with in Wingz.

Craig Stinson

SmartWare II

Informix's SmartWare II has surprising power for a spreadsheet in an integrated program. In addition to an extensive number of functions, this $1095 package lets you open a host of windows at once, link spreadsheets and even design ap-

plications with its built-in programming language. SmartWare's spreadsheet is a speedy performer, coming in near the top on our file routine and recalculation tests.

SmartWare is not as tightly integrated as Enable or Framework. Its various applications are really independent modules that have been sewn together. You can even purchase the spreadsheet portion of the program by itself for $508. Because of this approach, you can't display a word processing or database file in a window when you're in the spreadsheet module. You can, however, easily transfer data to and from these other applications.

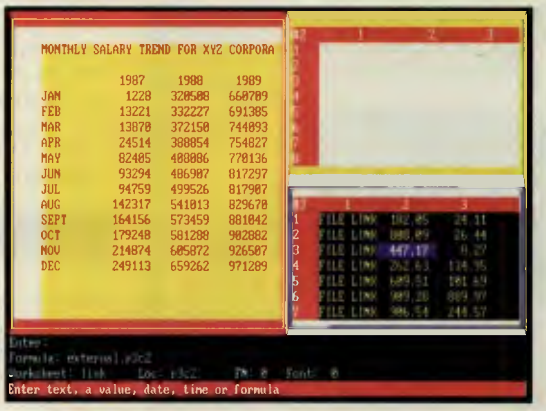
SmartWare's interface does take a bit of getting used to. It follows a convention predating the market dominance of Lotus 1-2-3 in which columns are identified by numbers instead of letters. Anyone bred to the 1-2-3 environment may find this approach awkward at first, but this system begins to look more sensible after a little time for adjustment: if you want to jump 15 columns, you needn't run through the alphabet. SmartWare's menus are also off-standard. Although the two-line menus at the bottom of the screen follow the Lotus style, the terminology is different: for instance, you name a range by typing '/Sheet Name Define'. And you must use the spacebar and backspace keys to scroll through the menus, instead of using the arrow keys.

A colourful approach

The worksheet screen seems stark at first; the black background is dressed up only by a simple, white border line. But you can make your screen look like a new-wave nightclub with a profusion of colours if you choose. Foreground and background colours can be added to the window border, window background, row and column labels, cursor bar and different types of cells (formula, text and so forth).

You can highlight individual cells and ranges by painting them. Such colour coding can help you to find related worksheets in a program that allows you to open up to 50 windows simultaneously by splitting the screen horizontally and vertically over and over again.

Windows are particularly helpful when it comes to linked spreadsheets, since they make it alot easier to follow the trail of data from one sheet to another. Unfortunately, you can only update single linked sheets one at a time. This can make it a cumbersome operation to keep models with several linked sheets up to date.



SmartWare II lets you open up to 50 windows at once. Each window can be set to a different colour, helping your eye distinguish between different windows. This is especially useful when you're working with linked worksheets like these

Smart functionality

Formatting choices for numbers, zero blanking, text justification and printing characteristics are not exceptional; you get the standard currency, date or percentage formats for numbers. But the program really shines when it comes to formulas: it has over 200 of them, compared with 1-2-3, Release 2.2's 92. Engineers and other technical types will particularly appreciate SmartWare's support for matrix mathematics.

Editor's choice

- **Quattro Pro**
- **Microsoft Excel**

Our Editor's Choice for spreadsheets comes down to a dead heat between Quattro Pro, the champion of the character-based world, and Microsoft Excel, the undisputed leader of the graphical interface world. Both offer superb analytical features, point-and-shoot file linking, near-presentation-quality graphics, solid connections with external database files and output fit for the boardroom. Both stand out from the rest in performance, too, with Quattro Pro ranking first overall in our tests and Excel coming in a close second.

At the same time, the differences between the programs are significant. Though less striking today than it was when introduced in 1987, Excel is still a strong contender. It features arrays, user-defined functions and display formats, sophisticated naming capabilities, background printing, robust auditing services, a powerful macro language and other features that its rivals can't match. On the other hand, Quattro Pro's built-in Bitstream fonts give you far more options than you will typically get with Excel. It prints graphs and worksheets together on the same page and has a full range of drawing tools in its annotation functions. It also supports direct access to both Paradox and dBASE files, has linear optimisation and file compression utilities built-in, and offers an excellent macro debugger.

In the end, your choice will depend as much on strategic considerations as on a straight-up comparison of features. Quattro Pro runs well in character mode on ordinary PCs, while Excel virtually demands a fast 286 or 386 PC with lots of memory. Quattro Pro is so compatible with 1-2-3 that Lotus emigrés can go straight to work, but Excel's ability to exchange data transparently with other Windows programs and its file compatibility across three operating platforms (Macintosh, Windows and PM) are equally strong considerations for many.

Which brings up the question, why not 1-2-3? 1-2-3, Release 3.0's three-dimensional design is superbly adapted for consolidation problems, and its industrial-strength database features make it a good choice for power users looking ahead to SQL. But its additional features strain its menu system, and its unorthodox use of extended memory makes it an uneasy partner for traditional DOS applications that depend on expanded memory. It lags behind the competition in performance and output quality as well. Though Lotus 1-2-3, Release 3.0 is more than a small step up from Release 2.2, the giant leap from Lotus won't come until Lotus 1-2-3/G is in full swing.

An honourable mention is due to Lucid 3-D, a great value at only $220. It's fast, easy to use, exchanges data with other DOS programs through its built-in clipboard and has rich macro features. If the spreadsheet application is secondary for you and you need only the basics, Lucid 3-D may be your most cost-effective choice.

DYNAMITE PACK

A 20 Disk Software Giveaway Explosion

Over 150 IBM Programs

Only $75 plus $6 Freight

For many months **SOFT-TALK** has been swamped with calls from people seeking PD and Shareware software products. As many of these products are either as good as, or even better than, many of their commercial counterparts; we could appreciate that this source provided a cheaper and logical substitute. As a result, we searched out, and obtained, the best PD and Shareware products we could find, and created this Dynamite Pack giveaway.

How To Save More! - PD & Shareware products may be copied by anyone and shared around. Even by **YOU**. - So get family and friends to share the expense, thus allowing everyone to obtain over 150 programs for less than $75. Example, three members means 75/3 = $25 each.

Games include: Dracula in London, Arctic Fox, StarQuake, Omega 3D Chess, 10th Frame Bowling, The Caverns of Larn, Kamakaze Alien, Moon Patrol, Ninja, Striker, Master Blaster, StarGlider, Sea Dragon, Beyond The Titanic, Tetris, Robotron, Novatron, Janitor Joe, Baseball, Scrabble, Asteroid Mine, Pacman, Pac-Girl, 747 Computer Simulated Flight, Attack on Altair, Bouncing Babies, Astre - The Galactic Adventure, Billiards, Burger Blaster, Empire, Flightmare, CaveQuest, By Fire & Sword, Paratrooper, Global Thermonuclear War, etc, etc.

Other Titles Include: CityDesk & The Lighting Press (Desktop Publishing), PC Write & Galaxy (Word Processors), As Easy As (Spreadsheet), DanCAD 3D (CAD System), The Remarkable General Ledger, In-Control (Database), AutoMenu (Software Management), Animator, TheDraw, AnsPaint, PC-Art, Finger Paint, Planets (Astronomy), Fortune Teller, PC-Desk, and much more.

For those who don't mind spending that little extra for quality commercial products in Business, Education, and Entertainment, we have access to over 3000 titles.

SOFT-TALK

P.O. Box 1158
Campbelltown N.S.W. 2560
Phone: (046) 26 3665

Datamini

the one with the 24 MONTH WARRANTY

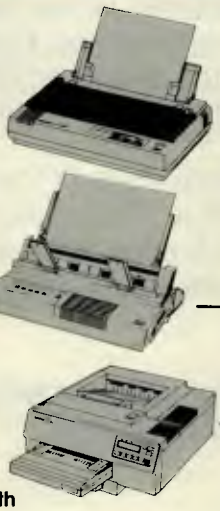
24 MONTHS WARRANTY

M-1824/M-1924
*270CPS *24 PIN LQ *32K BUFFER *6 FONTS *PUSH TRACTOR *PAPER PARK *AUTO TEAR OFF *COLOUR OPTION
10" $899 15" $1269

386 PT TOWER *80386-25 CPM *4 MB RAM – EXP TO 8 MB ONBOARD *25 MHZ *VGA 16 BIT VIDEO CARD *14" VGA MONITOR * 1.2 MB FD *44 MB VOICE COIL HD *NEW PROFESSIONAL TOWER CASE **$5299**

386 SX COMPACT
*80386SX-16 CPU *1MB RAM *16 20MHZ TURBO *VGA CARD *14" VGA MONITOR *1.2 MB FD *44 MB VOICE COIL HD *COMPACT CASE
$3499

BROTHER PRINTERS



***M-1209**
10" 160 CPS
$349

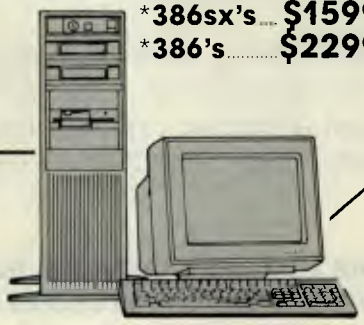
***M-1709**
15" 240 CPS
$699

***HL-8e**
8 ppm Laser
$3649

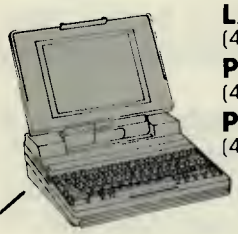
(Printer prices with systems only).

COMPUTERS

*XT's	$829
*286's	$1249
*386sx's	$1599
*386's	$2299



LAPTOPS



LA40 286 (40MB LCD)	$3799
PA40 286 (40MB GAS)	$3999
PA 386 (40MB GAS)	$7999

ACCESSORIES

*Datamini 60-120 MB Tape back-up	$659
*Datamini Mouse	$79
*Genius 6000 Mouse	$99
*Geniscan Scanners	$399

Datamini COMPUTERS

THE PERFECT PARTNERS

brother PRINTERS

(Dealer enquiries welcome)

Queensland distributor:
Datamini Computers Pty. Ltd.
22 Austin St., Newstead 4006
Tel: (07) 252 1025. Fax: (07) 252 1009

Victorian distributor:
Datamini Personal Computers
146 Hawthorn Rd., Caulfield 3161
Tel: (03) 528 1988, 523 0006
Fax: (61-3)528 5360

New South Wales distributor:
Amalgamated Office Services Pty. Ltd.
810 George St., Sydney 2000
Tel: (02) 281 4899. Fax: (02) 281 5695

Western Australia distributor:
Professional Technology
P.O. Box 818, 100 –
578 Murray St., West Perth 6005
Tel: (09) 322 1896. Fax: (09) 322 2508

At a glance

SmartWare II

Distributor: Informix Software
Telephone: (02) 488 7088
Price: Full integrated software package, $1095; spreadsheet module only, $508; upgrade from SmartWare 3.1 to full package, $225; upgrade to any single module, $125
Requires: 512K of RAM for spreadsheet module alone, 640K for full integrated software package; hard disk, DOS 2.0 or later. For LAN workstations: 640K RAM, DOS 3.1 or later
In short: Fast and very functional, SmartWare II's spreadsheet module benefits from the powerful programming language and database links that Informix provides for integrating its various applications. Though it will take a while to get used to its unconventional interface, it's a good choice if your spreadsheet work requires the support of an integrated package.

According to Informix, about half the people who buy this program build applications with it. SmartWare includes an English-like programming language that lets you create menus, automate operations and look to external programs (you can also record and edit macros). Informix has announced that the program will soon include links to minicomputer and mainframe programs; these links will let users design applications that can query centralised databases using SQL. The first such link the company is planning will be to Informix, its Unix database system.

When it comes to graphics, however, SmartWare's capabilities are not scintillating. Only seven graph types are available, though the program does give you a good degree of control over the text, data, borders and legends. I did notice one problem with the output, however. On a 3-D chart the lines that were used to create the cubic shape of the bars were missing in places, thus flattening the bars out.

As for output, you can make use of 64 preset fonts, including gothic, serif, sans serif and script, in varying point sizes, widths, slants, weights and attributes. You can even define your own versions of these fonts by varying the typeface characteristics. But the true fonts aren't displayed on the screen; they show up only in your printed output.

The program's online, context-sensitive help is worth a special mention, as it is exceptionally well done. It lets you search the full help text as well as using either an index or a table of contents, and hypertext links let you jump to related topics and then to return to your place.

SmartWare II is valuable on the whole as an integrated program whose spreadsheet module can stand up to the standalones. If your application requires robust formula and programming capabilities — and publishing features aren't much of an issue — it's worth a look.

Henry Fersko-Weiss

SuperCalc5

SuperCalc is an old-timer in the spreadsheet market, and Computer Associates has remained true to the goal of keeping its long-time users happy while offering a product competitive in the current spreadsheet market. Consequently, the $695 SuperCalc5 can still read SuperCalc files from yesteryear as well as Lotus 1-2-3 files, though it has grown to offer the advanced features today's spreadsheet users clamour for.

One of the few programs sporting true

LUCID 3D VERSION 2.2

THIS IS WHAT OTHERS SAY ABOUT LUCID 3D

"It packs a surprising number of features into a concise and easy to use package. It is the price performance leader of all the Spreadsheets we've seen."

"If Lucid were just a pop up Spreadsheet $220 would be a fair price, not even considering the 3D Features, Macro recording, Noting and Auditing."

"LUCID 3D can display up to nine overlapping spreadsheet windows. RAM Residency lets you pop Lucid 3D up over any other application you are working on."

"Lucid 3D's linking method removes the need to consolidate related worksheets into a single unweildy, memory grabbing model."

Lucid 3D, from Personal Computer Support Group, is an inspired little spreadsheet that solves all the usual problems in most unusual ways."

Mention this Advertisement and receive Lucid 3D for $150 plus delivery.

Peripheral Systems Pty Ltd
Unit 9/4 Campbell St
ARTARMON NSW 2064
Ph [02] 437 6255, Fax [02] 4391773

SAMTRON
LAPTOP AT 12mhz
40MB harddisk 25ms
Gas plasma Ega
$2950

XT Motherboard 31Mhz 640K
$499

Ethernet XT diskless workstation $1390

LAPTOP AT16Mhz
Harddisk 40MB 25ms
VGA 16 grey scale LCD
battery powered
$3999

MODEMS

M5 Smart Modem	$1950
M4 Smart Modem	$949
Smart 1234 SA	$775
In Modem 1234	$565
Automodem 1234	$585
Netcomm Fax Card.	$599
Profax Fax Card	$650
Minature 2400 modem	$499

HARDDRIVES

Kyocera 20MB & cont	$439
Kyocera 30MB & cont	$469
Miniscribe 42MB V/Coil & AT Cont	$699
Miniscribe 42MB Step with XT cont	$575
Priam 71MB H/H V/Coil & Cont	$1099
Fujitshu 68Mb H/H MFM V/coil	$1099
20MB Hardcard	$659
Panasonic 360K drive	$129
Teac 1.2MB drive	$149
720K floppydrive internal	$149
Toshiba 1.44Mb floppy drive internal	$179
External Floppy drives cases	$129
Tape backup Internal/External	$call

PRINTERS

Canon Laser Printers	call
Commodore laser printer	$1999
NEC LC-890 Postscript laser	$call
Epson GQ-5000 Laser Printer	$call
Fujitshu 5ppm postscript laser printer	call
Ricoh 6ppm Postscript laser	$6299
STAR HPII Laser printers	$3654
Canon BJ130 Bubblejrt printer	$1799
HP DeskJet plus	$call
Commodore 132 Col printer	$599
Epson LQ500	**$539**
Epson LQ1050	$1199
Epson LQ550	**$649**
Star NX-1000	$399
Star NX-1000 Color	$499
Star LC 2410.	$699
STAR PRINTERS	$call
NEC PRINTERS	$call
OKI PRINTERS	$call
Epson Printers	$call
Fujitshu Printers	$call
Fujitshu DX2400	$780
Fujitshu DL3300	$990
Roland Plotter DXY 1100	$1695
Roland Plotter DXY 1200	$2100
Roland Plotter DXY 1300	$3039

MONITORS

VGA Card & Monitor1024 x 768	$999
VGA Card & Monitor 640x480	$799
Memorex 14" Mono screen	$149
Magna 14" flatscreen mono monitor	$229
Magna 14" VGA Mono	$340
NEC 3D Multisync	$999
NEC 4D Monitor	$2100
TVM Multiscan MD-11	$989
Eizo 9060 flexiscan monitor	$1500

ADD ON CARDS

Floppy controller AT all formats	$90
Mono/Color Printer Card	$89
EGA Card 800x600	$169
VGA Card 800x600 8Bit	$199
VGA Card 800x600 16bit	$249
VGA Card 1024x768 16 bit	$399
Printer Card	$49
RS232 Card	$49
Clock card	$49
Game port	$49
Printer, RS232, clock, game card XT	$99
FDD, Printer, RS232, clock, game XT	$109
Printer RS232 Game Card AT	$99
Motherboard XT 10Mhz 0K	$179
Motherboard XT 640K Ram	$399
Motherboard XT 31Mhz 640K	$499
Motherboard AT 12mhz 0mb	$390
Motherboard AT 12Mhz 1mb	$690
Motherboard AT 16Mhz 0mb	$550
Motherboard AT 16mhz 1mb	$850
Motherboard 386-25mhz 0Mb	$1900
Motherboard 386-33mhz cache 0k	$3400
Hard Disk controller MFM	$119
Hard Disk controller RLL	$139
AT Floppy/Hardisk Controller	$199
Keyboard 101key	$129
Memory 256K chip (120ns)	$10
Memory 256K chip (80ns)	$11
Memory Sipps/Simms	call
Power Supply XT 150W	$149
Power Supply XT 200W	$220
Power supply Baby AT 200w	$190
Genius Mouse GM-6000	$125

ADD ON CARDS

XT Cabinet	$125
Baby AT Cabinet	$135
Tower Case with power supply	$499
PC Ram Card.	$85
Co-processor 386 20mhz	$875
Co-processor AT 10Mhz	$479
Printer Switch ABCD	$99
Printer Buffer 256K 4 in 2 out	$795
Parallel line booster	$290
Ethernet Cards 8 bit	$429
Ethernet cards 16 Bit	$449
Scanner & software.400 dpi	**$399**
CopyIIPC Deluxe Option Board.	$259
Genius Tablet	$649
Eprom Programmer	$850
cables all types and lengths	$call
Computer desks from	$179

BOOKS

HERE IS THIS MONTH BEST SELLERS	
Wordperfect5 complete reference	$55.00
Using MS-Dos.	$47.95
Using PageMaker	$47.95
Acad Complete Reference	$79.95
Using DbaseVI	$47.95
Using Lotus Manuscript	$39.95
Microsoft Word Made Easy	$39.95
Ventura V2	$47.95
Lotus 123 Made Easy	$39.95
Microsoft Works for the P.C	$41.95
Call For Other Book Titles	

CPU	SPEED	RAM	HARDDISK DRIVE	DISK DRIVE	SERIAL PRINTER/GAME	COMPUTER ONLY	MONO	VGA	VGA 1024 X 768
80286	6/12	1MB	20MB-68ms	1.2MB	1/1/1	$1,699	$1,799	$2,499	$2,699
80286	6/16	1MB		1.2MB	1/1/1	$1,449	$1,549	$2,299	$2,499
80286	6/16	1MB	40MB-61ms	1.2MB	1/1/1	$1,949	$2,049	$2,699	$2,899
80286	6/16	1MB	40MB-28ms	1.2MB	1/1/1	$2,149	$2,249	$2,899	$3,099
386SX	6/16	1MB		1.2MB	1/1/1	$1,949	$2,049	$2,699	$2,899
386SX	6/16	1MB	40MB-61ms	1.2MB	1/1/1	$2,349	$2,449	$3,099	$3,299
386SX	6/16	1MB	40MB-28ms	1.2MB	1/1/1	$2,549	$2,599	$3,199	$3,449
80386	8/25	2MB		1.2MB	1/1/1	$3,150	$3,250	$3,900	$4,100
80386	8/25	2MB	71MB-25ms	1.2MB	1/1/1	$4,050	$4,150	$4,800	$5,000
80386	8/33C	2MB		1.2MB	1/1/1	$4,650	$4,750	$5,400	$5,600
80386	8/33C	2MB	71MB-25ms	1.2MB	1/1/1	$5,550	$5,650	$6,300	$6,500

OPTIONS
ADD $250 PER 1MB RAM UPGRADE
ADD $199 FOR ADDITIONAL DRIVE
ADD $700 FOR 40MB TAPEBACK UP
ADD $30 FOR EXTRA SERIAL PORT

FREE
PUBLIC DOMAIN SOFTWARE
30 DAYS HOTLINE SUPPORT
1 YEAR WARRANTY

KOOKABURRA COMPUTERS

10 CURLEWIS STREET BONDI 2026

Telephone 365-0706 Facsimile 365-0366

Prices Include sales tax , Free Hotline support and advice
Prices and Specification are subject to change without notice

SuperCalc5 lets you display three different worksheet windows on the screen at once. Each of these can be split either horizontally or vertically

3-D worksheets, SuperCalc5 is very competitive with 1-2-3, Release 3.0 in multi-dimensional features. You can create a 3-D worksheet by pulling multiple 2-D worksheets into memory; they are saved together in a single .CAL file. You can also link worksheets in memory to files on disk by making complex references. The linkages are automatically updated whenever anything is done to change them. Unfortunately, you can't rotate the worksheet cube to get a different view of your model.

You can view one, two or three files in separate windows on the screen at one time. You can split an individual file into two windows and you can pull a file from disk into a separate window without closing the initial split-windowed file. This functionality is superior to Release 3.0's windowing capabilities, though you don't have as much flexibility in window placement as you do with Excel or Quattro Pro.

SuperCalc5 can work in as little as 512K of RAM, but it works better with a good chunk of expanded memory. The program is character-based, and several of its advanced features such as minimal recalculation and the undo feature can be removed from memory to allow more space for your spreadsheets. But we found it wasn't possible to run our linking tests unless we used expanded memory. SuperCalc5 supports up to 32M of expanded memory, so if you have the equipment for it, you can create large 3-D spreadsheets, loading as many as 255 into memory at one time. Files saved in SuperCalc5's native .CAL format occupy less disk space than the same files saved in other formats because the program incorporates a squeezing technique to save disk space.

'A feature-laden spreadsheet package with exceptional auditing functions, SuperCalc5 continues to be a formidable contestant in the spreadsheet wars.'

At a glance

SuperCalc5

Distributor:	Sourceware
Telephone:	(02) 427 7999
Price:	$695; Silverado for SuperCalc5, $260
Requires:	512K RAM, hard disk, DOS 3.0 or later
In short:	A rich complement of features, true 3-D capabilities and superb auditing features make SuperCalc5 an impressive spreadsheet choice. Newcomers to the spreadsheet market will find that the program's interface stands in the way of getting their work done easily.

Auditing power

SuperCalc5 has solid spreadsheet features that can perform just about any function; they give you great flexibility. Its most notable talent lies in its superb auditing capabilities. Computer Associates is strong on good spreadsheet modelling techniques, and in SuperCalc5 it supplies the tools you need to make spreadsheets easy to update and understand. One such tool presents aerial views of the spreadsheet that you can use to detect patterns

Hardcard II 80*

The quickest hard disk upgrade in town

and still only 1" thin

19 millisec effective access time

16 bit interface for 286/386 PCs

Drivers for OS/2, Novell 3 Com 3 plus Open, IBM, PC Lan and DOS 4.0

All for only $1495 (inc tax)

More storage in a flash. Ask your dealer how.

*Hardcard II 40 also available

Plus

Distributed by

Tech Pacific

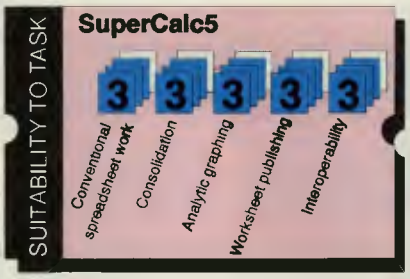
LEADERS IN PC ENHANCEMENT

SYDNEY: 5-15 Epsom Rd, Rosebery NSW 2018 Ph (02 697 7111

MELBOURNE: 219 Glenhuntley Rd, Elsternwick Vic 3185 Ph (03) 523 0866

BRISBANE: 165 Moggill Rd, Taringa Qld 4068 Ph (07) 371 7866

INQUIRY 255



and data-typing problems; another lets you create a map that highlights cells dependent on formulas and values in other cells — or cells that reference blank cells — so that you can find bad references.

Strong 1-2-3-compatible macro capabilities, data encryption and the ability to exchange files with the mainframe version of SuperCalc5 add even more value to the package. The program's built-in data management capabilities are not exceptional, but they can be augmented by using Computer Associates' Silverado for SuperCalc5, a $260 add-in that lets you read and write external database files.

SuperCalc5 has solid spreadsheet publishing and graphics features as well. In addition to the common graph types, SuperCalc5 adds hi-lo, radar and 3-D graph options. You can create dual charts, with one chart representing an enlarged section of the other chart. Graphs can be customised by using full-screen tables for the representations of your choice. This requires switching between graph and option screens, but the results are good.

SuperCalc5's greatest shortcoming is its interface. To remain keystroke-compatible with previous versions of the program, all its additional features have been tacked onto the existing menu system. The slash-activated menus displayed along the bottom of the screen have been extended to a double-slash menu tree, bloating the menu tree to the breaking point. While this may be fine for long-time SuperCalc users who can slash their way through the jungle of menu items with ease, it can be a daunting task for a new user. According to company representatives, Computer Associates is currently looking into developing a version of SuperCalc to work within graphical environments; this may alleviate the interface problem, but in the meantime, be prepared for rough going.

A feature-laden spreadsheet package with exceptional auditing functions, SuperCalc5 continues to be a formidable contestant in the spreadsheet wars. With a proper interface-lift, it could be even more attractive.

Catherine Miller

END

Microsoft Excel and Quattro Pro take the prize for overall best performance, though Lucid 3-D, SmartWare II and Lotus 1-2-3, Release 2.2 do best on individual tests. Lotus 1-2-3, Release 3.0's mandatory background recalc and disk-intensive link refresh methods impose a heavy performance penalty.

We tested the spreadsheets reviewed in this issue on a Compaq Deskpro 386 running at 25MHz, equipped with 4M of RAM and an Intel 80387 numeric coprocessor. We used Compaq DOS 3.31 as the operating system for the DOS products; the OS/2 products were tested under OS/2, version 1.2.

We contacted the vendors of each product to find out the recommended amount of expanded memory (under Compaq's CEMM driver) or extended memory (under 80386 real and protected modes) to use with their products. In most cases, the vendors opted for 1M of expanded memory in addition to 640K of conventional memory. The exceptions were Lotus 1-2-3, Release 3.0 (DOS version) and Quattro Pro, which used extended memory and SmartWare II, which used only the 640K of conventional memory.

The five performance tests for spreadsheets were timed manually with a stopwatch. The clock was started at the final keystroke of the command sequence that began the test and was stopped when the system finished processing completely, whether in the foreground or the background.

The tests themselves were created in Lotus 1-2-3, Release 2.2 and imported into the other package. Formula adjustments were made as necessary to account for imperfect importing of .WK1 files. Before testing began, each worksheet was saved in the native format of the spreadsheet package to be tested and then reloaded in that format. In all cases, the packages were set for manual recalculation.

The values for memory and disk space usage were acquired from each program's status or environment report.

MARTOT COMPUTER PRODUCTS

P.O. BOX 87, MERRYLANDS, NSW, 2160
Phone: (02) 681 1708
Fax: (02) 682 4521

GENIUS MOUSE GM-F302
The ultimate high performance mouse
- 1050 dpi resolution
- MS & PC mouse compt.
- Serial 3 button
- Includes: ✣ drivers
  ✣ menumaker
  ✣ Dr. Genius
  ✣ Mouse Pad
  ✣ Mouse Pocket

Full 12 months parts & labour warranty
Full service & support in Australia
Free software upgrades for 12 months

$119 (inc. tax)

Genius Mouse GM-F302P $129
■ for PS/2 PC
Genius Mouse GM-6000 $99
Genius Scanner GS-4500 $425
Genius Digitiser GT-1212B $590
■ includes stylus

NEW PRODUCT
HANDWRITER
- Complete keyboard replacement
- Recognises handwriting
- Eliminates need for keyboard skills
- Eliminates swapping between keyboard and other input devices
- Eliminates seperate data entry as form filling is directly input to PC
- Template applications available for 1-2-3, Autocad
- Design your own forms with FormMapper

Handwriter card $1095 (inc. tax)
(inc DOS template)

Handwriter Complete
with Digitiser $1685 (inc. tax)
Lotus template $295 (inc. tax)
Autocad template $395 (inc. tax)
Formapper $695 (inc. tax)

INFORMATION KIT AVAILABLE

GENIUS TABLET OWNERS
INTRODUCTORY OFFER
10% OFF ALL
HANDWRITER PRODUCTS
CALL FOR DETAILS

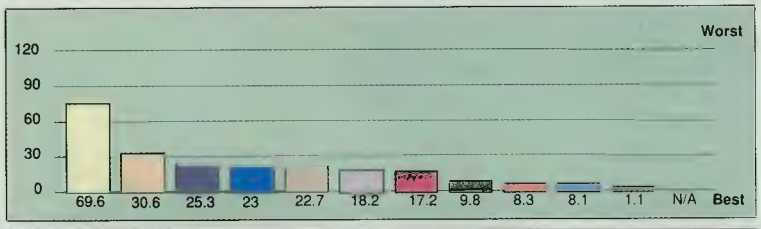
DEALER ENQUIRIES WELCOME

Performance tests: file linking spreadsheets

The **Mathematical Worksheet Recalculation** test measures the time a program takes to calculate a worksheet containing 1456 mathematical functions (square root, addition, subtraction, multiplication, division and @SUM)

Mathematical worksheet recalculation

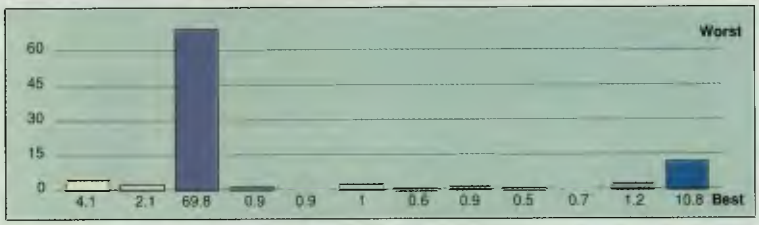
Elapsed time (seconds)



The **Loan Recalculation** test calculates the monthly payment and displays the amortisation schedule for a 30-year mortgage with a given loan principal. All columns except the payment and month number require recalculation

Loan recalculation

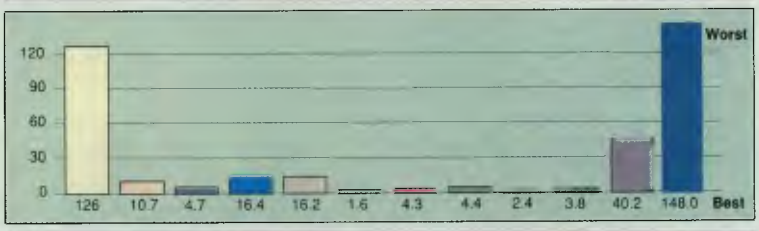
Elapsed time (seconds)



The **Internal Rate of Return** test calculates the Net Present Value (NPV) and Internal Rate of Return (IRR) for 253 different 10-year cash flows. During the test, NPV figures remain constant, but we forced the IRR function into recalculation by changing the iteration guess factor. Programs that use intelligent algorithms will recognise this distinction, while those that don't must recalculate the NPV figures, slowing their times

Internal rate of return

Elapsed time (seconds)

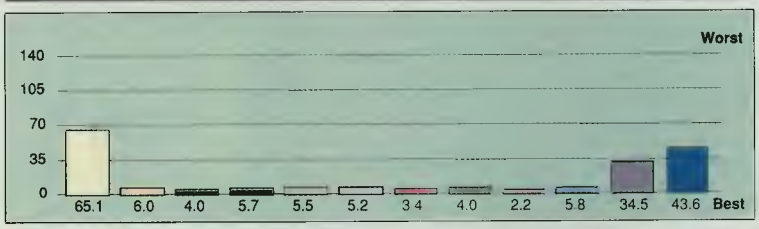


The **Database Sort** test times the sorting of a 995-record database containing text and values. The sort uses both primary and secondary keys from the 10 possible fields, and no recalculations are required

Framework III allows only one sort key, so the spreadsheet was sorted twice, in keeping with the vendor's procedure for performing secondary sorts. The two times were added together to produce this one score

Database sort

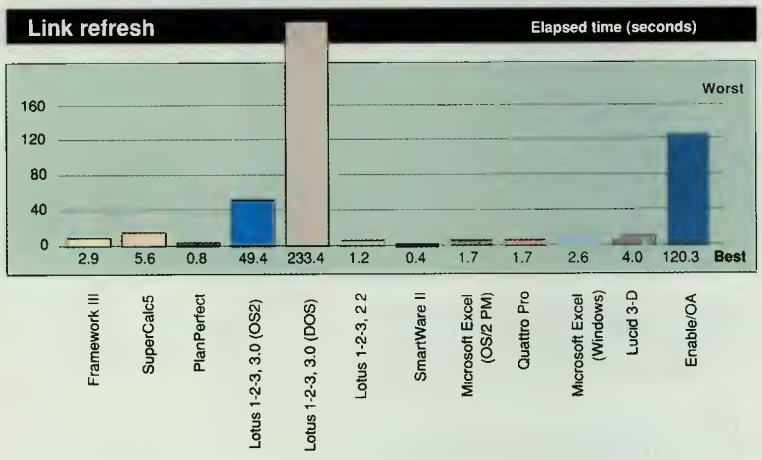
Elapsed time (seconds)



The **Link Refresh** test evaluates the sophistication of the program's linking search algorithm. Five columns by 200 rows of an external reference worksheet were linked to the corresponding cells in a link worksheet, and we measured how long the package took to refresh the links completely. The reference worksheet was kept on-disk when possible; otherwise it was held in memory. Long times typically indicate packages that must poll the disk to find the linked values on the reference sheet, even if no linked values have changed

Link refresh

Elapsed time (seconds)

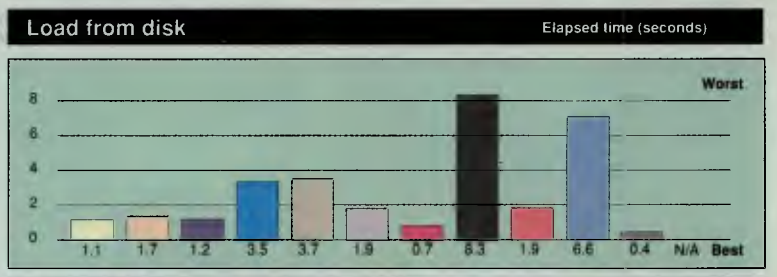


N/A — Not applicable:

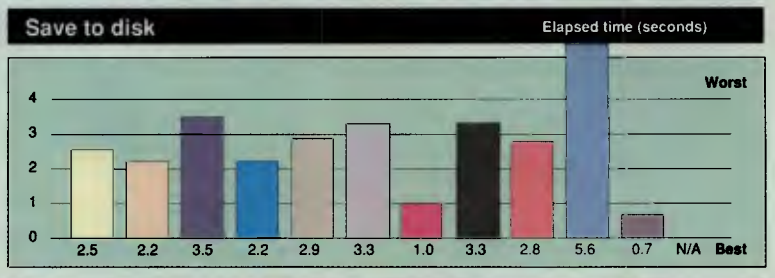
Enable/OA could not load or run the mathematical recalculation file because of its memory management restrictions

Performance tests: file linking spreadsheets

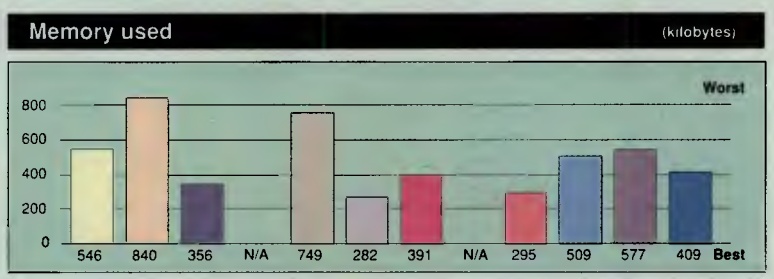
The **Load from Disk** test measures the time it takes to load the Mathematical Worksheet Recalculation file from disk to the program's native file format



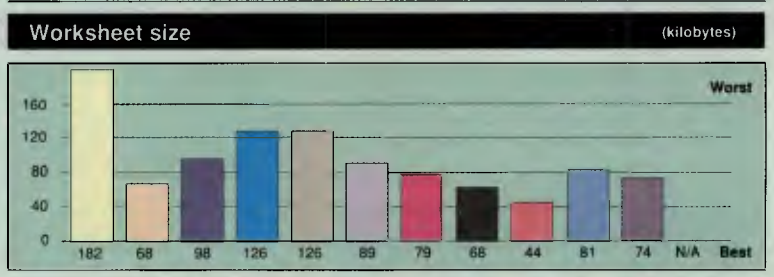
The **Save to Disk** test measures the time it takes to write the same test file to disk in the program's native file format



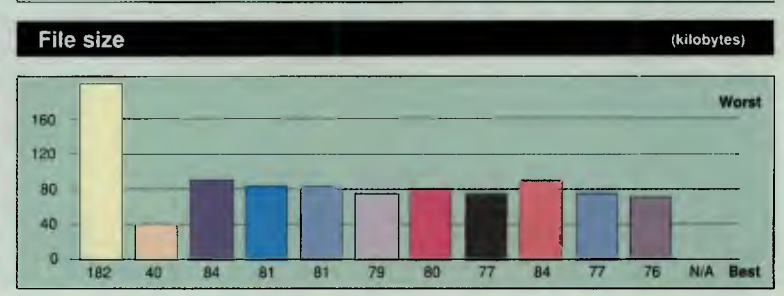
Used reports the amount of RAM used when the spreadsheet program is loaded and active but does not contain worksheets. Key factors here are the size of the program and its ability to use overlays or virtual memory to swap modules in or out of RAM as needed. Smaller values generally mean the program can handle larger spreadsheets



Worksheet Size reports the amount of RAM needed to contain the Mathematical Worksheet Recalculation file. If this is smaller than the size of the file on disk (see File Size), it may indicate that the spreadsheet uses tokenisation to conserve memory space, which in turn permits you to use larger spreadsheets and makes more RAM available for overhead operations



File Size reports the size of the Mathematical Worksheet Recalculation file written to disk in each program's native file format. Use this number to determine the effectiveness of memory handling and virtual-storage techniques by comparing it with the result found under Memory Used. In most cases, each package tokenised the saved spreadsheet to conserve disk space



Framework III
SuperCalc5
PlanPerfect
Lotus 1-2-3, 3.0 (OS2)
Lotus 1-2-3, 3.0 (DOS)
Lotus 1-2-3, 2.2
SmartWare II
Microsoft Excel (OS/2 PM)
Quattro Pro
Microsoft Excel (Windows)
Lucid 3-D
Enable/OA

N/A — Not applicable:

Enable/OA could not load or run the mathematical recalculation file because of its memory management restrictions; hence, it could not perform any tests involving that file (Load from disk, Save to disk, Worksheet size and File size)

Memory Used does not apply to programs running under OS/2, a virtual operating system that allocates memory according to system demand

JOHNSON TECHNOLOGY
PTY LTD

536 PACIFIC HIGHWAY, ST LEONARDS 2065 *or* PO BOX 363, ST LEONARDS 2065
TEL: (02) 906 3751 FAX: (02) 906 3073

EDGE 386

YOUR COMPANION TO FASTER & MORE POWERFUL COMPUTING

80386 - 33MHZ SYSTEM (LANDMARK 59.7 MHZ)

- 4M ON BOARD RAM
- 32K CACHE MEMORY
- 82385 - 33 CACHE CONTROLLER
- 80 MB VOICE COIL HARDISK (25 MS)
- DTC 7280 (1:1 INTERLEAVE) CONTROLLER
- BIG TOWER CASE (6 HALF HEIGHT DRIVE)
- 1.2 MB FLOPPY DRIVE
- 1 SERIAL / PARALLEL / GAME PORT
- 16 BIT TRIDENT VGA CARD (1024 X 768)
- CTX MULTISYNC MONITOR
- SLOT 32BIT X 1, 16BIT X 6, 8BIT X 1

EDGE 80386-20 MHZ SYSTEM (LANDMARK SPEED 30.1 MHZ)

- INTEL 80386-20 CPU
- 2MB ON BOARD RAM (EXPANDABLE TO 8 MB)
- 64 MB VOICE COIL HARDISK (25 MS)
- MINI TOWER CASE, 220W POWER SUPPLY
- 16 BIT VGA CARD
- 1 SERIAL / PARALLEL / GAME PORT
- 1.2 MB FLOPPY DRIVE
- CTX VGA MONITOR

EDGE BAZAAR SALE

	MONO	EGA	VGA
386-33MHZ 4MB 32K CACHE 80MB V.C. HDD	5380	5780	5880
386-25MHZ 2MB 64K CACHE 80MB V.C. HDD	4160	4680	4780
386-20MHZ 2MB 64K CACHE 64MB V.C. HDD	3780	4280	4380
386SX-20MHZ 2MB RAM 66MB V.C. HDD	3380	3880	3980
386SX-20MHZ 1MB 40MB V.C. HDD	2600	3100	3200
AT-20MHZ 1MB 40MB V.C. HDD	2300	2800	2900
AT-16MHZ 2MB 40MB V.C. HDD	2088	2588	2688
AT-12MHZ 1MB 20MB HDD	1550	2050	2150
XT-12MHZ 640K 20MB HDD	1200	1700	1800

ALL SYSTEMS WITH FLOPPY DRIVE, 101 KEYBOARD, REAL TIME CLOCK, SERIAL, PARALLEL AND GAME PORTS

386-SX LAPTOP 1MB 40MB V.C. VGA GAS PLASMA $4200
286-10 LAPTOP 1MB 40MB V.C. LCD SCREEN BATTERY $3500
GENIUS MOUSE GM-F302 ..... $120
GS-4500 SCANNER W/OCR $450
NEC 3D MONITOR WITH 16BITS 512K VGA CARD (1024 x 768) $1230
NEC CD ROM WITH AT BUS INTERFACE $1050

3-D CADD on your PC

Jeff Prosise and his team of experts conclude our two-part feature on high-end CADD packages.

Part 2 of our feature continues on from last month, where we reviewed four PC CADD systems: AutoCAD, Cadkey, DesignCAD 3D and Drawbase 5000. This month, we screen-test MicroStation PC, Personal Designer, RoboCAD and VersaCAD/386. We also present a full comparative features table and a benchtest chart, so you can compare all products included over the two issues.

MicroStation PC

Intergraph's $5550 MicroStation PC is a powerful design system that excels in situations where several people are working on a project together. It has its roots in Intergraph's IGDS (Interactive Graphic Design System), a product that runs on big VAXes. MicroStation PC is essentially a superset of IGDS, and the PC version will soon have a full graphical user interface like that of its minicomputer counterpart.

Several concepts in MicroStation PC differ from most other systems. For instance, in MicroStation PC you perform some operations on individual entities or graphic groups. Graphic groups are specific groups of entities that were either created together or gathered together with special commands. An entity may only belong to one graphic group.

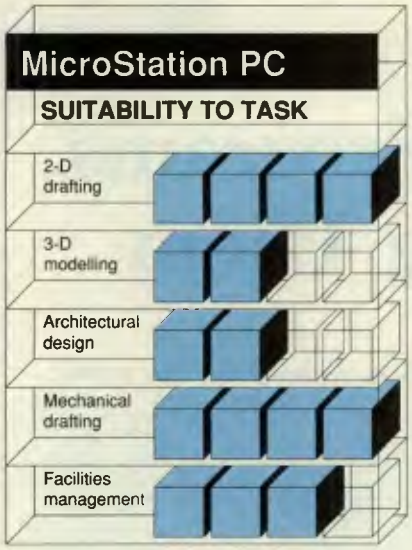
Other operations are performed on groups of entities, fences and working sets. A fenced area may be a simple rectangle (or volume, in 3-D) or any area enclosed within a complex polygon. With all fences you have the option of choosing items entirely within a fence or partially within the fence, or of clipping the items at the fence boundary. There is no way to save a particular fence — it remains active until you redefine it. If you need to deal with more than one fenced area at a time, you can add entities, graphic groups and other fences to the working set.

Rather than having you select a function and then choose the objects on which to perform that operation, MicroStation PC has a separate set of functions to use depending on whether you are working with an entity/graphic group or a fence/working set. Most functions are available to either type but require different commands. While these are very complex and powerful tools, the need for a completely separate set of commands seems cumbersome and outdated.

Tablet menus are more or less shunned in MicroStation PC in favour of icon-like on-screen graphic tutorials (similar to AutoCAD's dialogue boxes) and lots of on-screen menus. In order to create the test drawing, most commands were selected from a screen menu, with modifications and distances occasionally entered from the keyboard.

A different way of entering data

Data entry in MicroStation PC is also a little different from other systems. Four buttons are activated on tablets used with



the program, while three buttons are used on a mouse. These functions are given the names Data, Tentative and Reset (and Command for tablets). Data and Reset act similarly to any other system's pick and reset buttons. The Command button is used with the tablet to distinguish between a command and a digitised point. By choosing either a Data button or Command button you indicate which type of input you are sending to the program.

The Tentative button stands apart from features found in other systems. Select Tentative and the system will snap to and highlight (simultaneously in all displayed views) the first of the possible snap-to-points or entities it sees in the database. If that's what you want, then simply press the Data button to confirm. If not, hit the Tentative button again until the item you are looking for is highlighted.

You will immediately recognise the importance of this feature if you have ever tried to select one of several lines lying on top of each other in a particular view. Tentative is also used for locating intersection points and offset points.

MicroStation PC's reference files have always had a leg up on the competition. A reference file is a drawing attached to the current drawing. This type of file can be scaled, rotated, clipped and placed anywhere in the current drawing. Any changes made to the attached drawing automatically appear in the current drawing when the system is updated.

Reference files are critically important to the future of CADD as a workgroup tool, and their presence in MicroStation PC gives the package a huge head start in that arena. Suppose you are developing a reflected ceiling plan and you designate the underlying floor plan as an attached file; now imagine that someone else is simultaneously working on the same floor plan. That way if a wall is moved, you'll see it happen on your screen when you update the reference file (in some cases this happens almost simultaneously).

You can also have a file reference. Take an area you wish to detail, call it in as a reference file, make it a different scale and clip it. Voilà! You have an instant self-updating detailed drawing sheet.

At a glance

MicroStation PC

Distributor:	Integraph
Telephone:	(02) 888 9900
Price:	$5550
Requires:	640K of RAM, 20M hard disk, communications port, one parallel port, numeric coprocessor, DOS 3.0 or later. Mouse or digitising tablet recommended
In short:	An extremely potent design and drafting system with the best information management in the industry. This package is best for organisations where more than one person works on a project at the same time.

MicroStation PC in 3-D

MicroStation PC's 3-D facilities are limited but powerful. 3-D entities include any 2-D entities defined in space, flat planes, cones, cylinders and surfaces of projection and revolution. It lacks primitives for spheres, complex surfaces such as Coons patches and ruled surfaces, solids and Boolean operators. But the entities that MicroStation PC does provide are fully implemented, integrated and usable.

Creating the test part was not difficult, once two important concepts were understood. First, to create a fully surfaced

CLARION

PC MAGAZINE EDITORS' CHOICE

INFO WORLD Clarion Professional Developer 8.2

"I Get Paid to Write Programs. And Now, I'm Writing Them Twice As Fast."

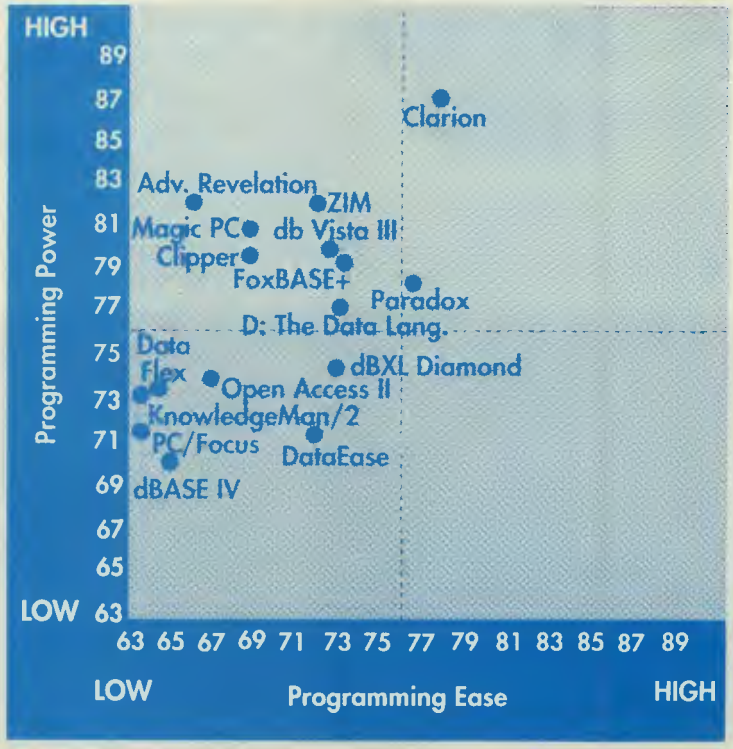
PC WEEK – U.S.A. — August 28, 1989.

If you write programs for a living, get to know The Clarion Professional Developer 2.0.

It can cut applications development time by 50% or more without compromising your design. It's so fast and easy, you can complete prototypes while your clients watch.

Professional Developer 2.0 can interface to routines from C and Assembler. It allows import and export of dBASE, BASIC and DIF files. Its application generator produces commented source code which can be easily adapted with its utilities to allow you to generate .EXEs. Network support is included at no extra cost. There are no run-time licences or fees.

Or, if you don't want to be able to customise the code produced by the Clarion Designer, or produce .EXE files, but you do want to produce powerful database applications, ask about the Clarion Personal Developer.



Professional Developer is an immensely powerful, easy-to-use DBMS application developer. We didn't say it: The PC WEEK poll of corporate satisfaction said it. We came out head and shoulders above the 15 other programmable databases. No one else came even close.

In this business where time is money, let Professional Developer help you generate more money for your time. To show how easy it is to produce applications with Clarion, we are including a simple CASHBOOK program with the introductory material which we developed in two hours with NO coding, free of charge.

Clarion Professional Developer	$950
RT-Link Overlaying Linker	$265
Limited Time Offer – Professional & RT-Link	$999
Clarion Personal Developer	$280

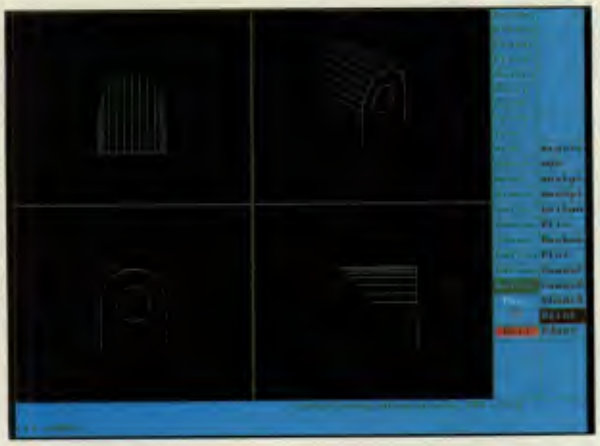
Digital Solutions Pty Ltd Incorporated in Queensland

Level 1, No. 6 Wighton St., Margate 4019.
P.O. Box 178, Margate 4019.
Phone: (07) 883 1851. Fax: (07) 283 1217.
B.B.S.: (07) 283 1237.

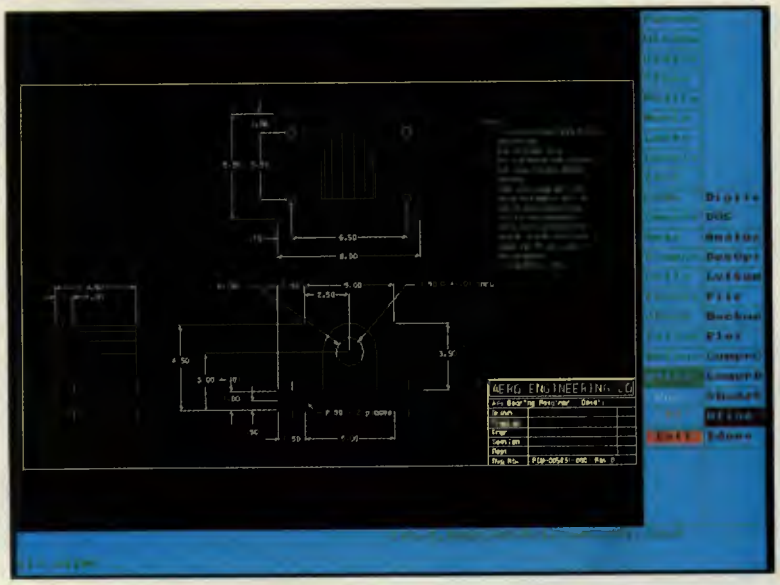
For Introductory Material Simply Return This Coupon

Name _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____
Mail This Coupon To

2 DIGITAL SOLUTIONS
P.O. Box 178, Margate, Qld. 4019



MicroStation PC has an easy time with the test image. Hidden-line removal has been activated for these views, but reference files have yet to be attached



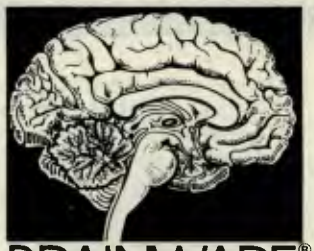
A finished and fully dimensional drawing of the 3-D part as produced by MicroStation PC. A hidden-line routine has been run on this file to make the drawing look better

extrusion rather than a hollow box-type extrusion, you must create a shape out of existing entities. Line strings must be dropped back to lines before you do this. Second, and more critical, the view in which you select the shape for projection affects that projection.

Once this was absorbed, producing the 3-D model became a trivial exercise. Two points should be made, however. First, you cannot perform a fillet if the line left after the fillet has a zero length. And since there was no Boolean operations, you cannot construct the intersection between the inclined plane and the cylindrical front piece. MicroStation PC will perform the surface shading correctly and the hidden-line removal shows the resulting intersection, but there is no easy way to generate the intersection as part of a standard view.

The interesting detail about this exercise was the self-referenced view function used to create the drawing sheet. Instead of extracting 2-D information for each view, I attached a reference to the current file using predefined views. The effect: several rotated views of the model within the current drawing, all of which were automatically updated when the original was modified. I could then select a plane in which to work, draw all the dimensions in that plane and reference them back to the attached files.

Like AutoCAD, MicroStation PC is a CADD engine. A multitude of third-party, highly sophisticated, application-specific software can turn MicroStation PC into the solution for many disciplines, including architecture, mechanical design, piping, plant design, mapping and even geographic information systems.



BRAINWARE®

A TOTALLY NEW CONCEPT IN SOFTWARE – VALUE!!!

$49.95

CONTACT MANAGER

CUSTOMER INFORMATION AND TRACKING

- Full company name and address.
- Contact name.
- Representative assigned to Contact, Telephone and Fax number.
- Customer type.
- Market Code.
- Includes a notepade-style storage of information on contacts that can be easily read and updated, very useful for maintaining calls.

FULL FEATURED WORD PROCESSING

- User-tailored function keys.
- User-maintained printer enhanced features, e.g. hold, underline, etc.
- Super-fast string search and replace.
- Document merging.
- Block marking and copying.
- Reads ASCII or Wordstar files.
- Help Screens.

GLOBAL SEARCHING FACILITIES

- (Whole directory) usually found in comprehensive library systems.

HARD COPY

- Prints all or specified accounts in any sort key sequence.

FULL-FEATURED CALCULATOR

- Is resident and available at all times.

ALSO!

KOALAN MS-DOS LAN

It's a medium size LAN for schools and small business.

- It has 2.5 Mbit transfer rate using ARCNET cards.
- It incorporates a low level communications driver at each end, a redirector driver at the slave, and a server driver on the master.
- Printing can be performed with full spooling functions.
- SHARE.EXE compatible file and record locking applications are fully supported.

Unlimited users (up to 256).
Buy our ARCNET cards or supply yours.
Simple and easy to install (5 minutes).
Transparent to all users.

Software $69.96

CALL NOW

(018) 310 455, (018) 349 867, (018) 324 001

MicroStation PC could benefit from a good tutorial, associative dimensioning and its upcoming graphical user interface. Even in its present state, it's easy to recommend this package — but for career CADD users only. It's as a workgroup CADD solution that MicroStation PC really shines, and its reference files make it the state-of-the-art package for networked CADD workgroups.

Personal Designer

When it comes to 3-D modelling and engineering design in the workstation arena, Computervision has long been recognised as a major player. In the DOS market, the company takes a modular approach to the topic with its Personal Designer system. The $5570 microCADDS GCD module (Personal Designer's graphics editor) offers capabilities well above those found on comparable systems. Coupled with the $2715 microCADDS Surfaces, you have a system that comes close to bringing workstation CADD power to the PC.

The menu-driven installation process allows you to optimise your system and install optional packages such as Surfaces. Because the installation routine is well written, setup is painless.

Due to copy protection, however, installation is a little tricky. Computervision uses a combination of a hardware lock and software code numbers to provide software security. To receive security codes the new user must call Prime Computer; the company calls back within 24 hours to assign a string of security code numbers for each software module. Codes are installed on the system via a security configuration program. While it doesn't make setting up the software more difficult, it certainly does make the process more involved.

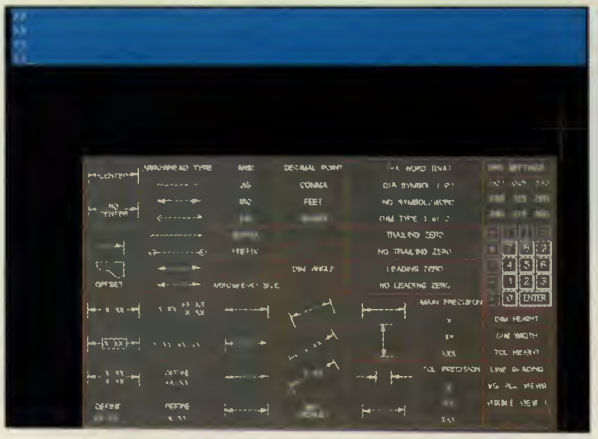
Personal Designer supports both mice and digitising tablets. The optional screen menus are a combination of icons and keywords, making the mouse a good alternative to higher-priced tablets. In every case the icons are a good representation of what the function hidden behind them will do, which makes learning the program a snap. An experienced CADD user can be up and running in 2-D on the system in a single day.

Direct command entry on the prompt line allows more flexibility with many of the commands than is available from the menus. But like many workstation-based systems, command syntax and the sheer number of options available may make keyboard entry puzzling to the new user. Not to worry. The screen interface is so complete that even seasoned users won't need to touch the keyboard very often on most projects. What makes learning the command syntax worthwhile is the ability to use other commands transparently within the current one by simply typing in its modifier. Display options, grid size and the use of entity selection filters are good examples of the many commands that can act transparently.

At a glance

Personal Designer

Distributor:	Prime Computer
Telephone:	(02) 968 9200
Price:	Standard edition (microCADDS GCD), $5570; DOS-Extended Edition, $8280; surfaces and shading module (microCADDS Surfaces), $2715
Requires:	2M of RAM, Intel 80387 numeric coprocessor, DOS 3.1 or later. Mouse or digitising tablet recommended
In short:	With Personal Designer, Computervision has successfully bridged the gap between workstations and PCs for complex surface modelling, albeit at a rather high price. Its 3-D facilities are a cut above those of many other CADD programs.



Personal Designer's dimensioning set-up screen gives you a good idea of how complete its set of drawing tools is. Virtually every kind of dimensioning is available here

Creating a complete 3-D wireframe image isn't too much of a challenge for a program as powerful as Personal Designer. All the tools you need are always close at hand

Performing up to par

Personal Designer performs a number of general geometry-manipulation actions very well. A host of construction line functions let you generate construction entities, and a wide range of functions help you easily copy, move and edit existing data. You can use absolute or relative specification for both linear and polar location of points, and in many cases you need only enter the x or y co-ordinate.

Personal Designer's entity selection filters and techniques are probably some of the best and most versatile in the PC realm. You can select entities inside the selection window, outside the window, crossing, inside and crossing, outside and crossing — and many other combinations.

D-Link

The Smart, Simple Way to Your Networking Operation

"Why isn't there a Local Area Network that doesn't cost the earth and is simple enough to install by myself? They all need a professional engineer to get going, and they cost too much per PC!"

THE D-LINK LAN RANGE

Waiting for a LAN you could both afford and understand was a good decision.

LANsmart RELEASE 2

With the release of LANsmart V2, the workstation memory requirements are reduced to as little as 2Kb.

Use the technology you need at the price you can afford. All products have D-Link's unique resource sharing architecture.

No special hard disk formatting. Share disk and print resources anywhere on the LAN.

A full IBM NETBIOS emulation which delivers state of the art LAN power with a simple, default-driven user interface. Use it virtually as delivered, or tune it for special multi-user requirements.

There are gateways available for Async, System 38, TCP/IP, VAX VMS, UNIX (TM) and others.

LANsmart offers full performance at a price far lower than other LANs.

HARDWARE OPTIONS

When you choose LANsmart you also get a choice of hardware to suit your requirements.

Standard Ethernet	DE-100
Standard Arcnet	DA-100
Twisted Pair 2.5MBit/s	DX-100

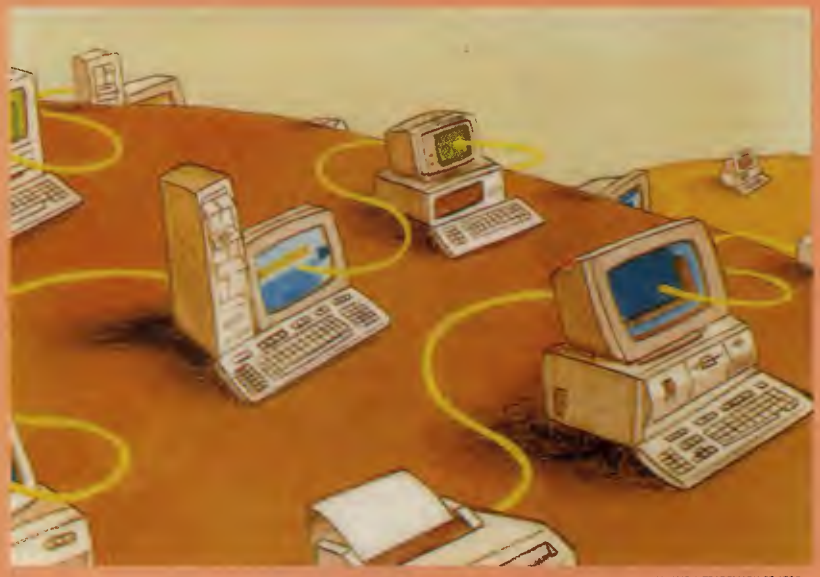
Microchannel cards also available

HARDWARE LICENSING

LANsmart now has site and limited-use licensing options from entry level through to multi-site installations.

Call for further information.

Dealer enquiries welcome.



UNIX IS A TRADEMARK OF AT&T

D-Link

SYDNEY

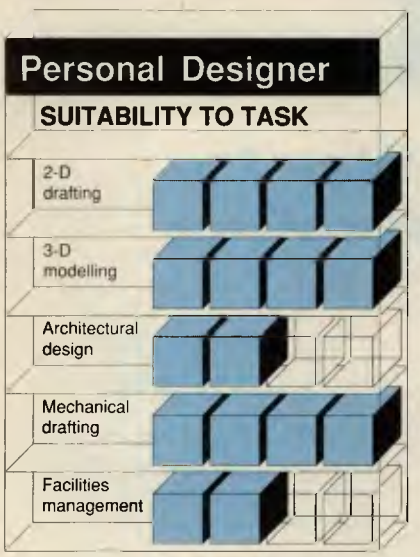
Kincolith P/L	Ph: (02) 977 4466	Fax: (02) 977 6150
ACTek Systems P/L	Ph: (02) 977 5086	Fax: (02) 977 6150

MELBOURNE

ACTek Systems P/L	Ph: (03) 419 8400	Fax: (03) 417 3313

BRISBANE

Logisoft Australia	Ph: (07) 870 7105	Fax: (07) 371 6169



An unexpected but very welcome feature comes in single-entity selection. If you mistakenly choose an entity you don't want in the group, simply pressing a mouse button rejects it and takes it out of the set, allowing you to continue uninterrupted selection. If there are multiple entities that fall under your pick box, Personal Designer has the intelligence to step through the possible entities as you reject them, rarely picking up the same one twice. This feature takes all the aggravation out of selecting entities that are either coincidental or very close together in the view.

Everything that Personal Designer does in 2-D it does well. Dimensioning and text entry are everything you would expect from a system of this calibre and its icon-driven dimension set-up screen gives you quick and easy control of tolerance styles and values, dimension styles and physical dimension features. It also provides built-in geometric tolerancing groups that can be selected and inserted via icons. But for all its power and ease-of-use in 2-D, what really sets Personal Designer apart from other CADD packages is the surfacing and shading capability you will find in its microCADDS Surfaces module.

Powerful surface and shading features

The optional Surfaces module provides functions for creating tabulated, ruled, swept, extruded and Coons-patch surfaces using lines, arcs, curves and special curve-definition entities called cpoles. The sheer number of functions for creating and modifying surfaces is impressive, but the fact that they are so simple to use is even more so. (Personal Designer's emphasis on surface modelling — it offers some of the most sophisticated tools in this area available for a DOS machine — results in the absence of solid modelling functions.)

Functions to create planes and use them to find their intersections with a surface, automatically generating a string at the intersection, exist; surface-to-surface intersection can also be defined by invoking the function and simply identifying the surfaces involved. Also included are functions to fillet, join and smooth surfaces.

'With Personal Designer, Computervision has combined ease-of-use and powerful surfacing to successfully bridge the ever-narrowing gap between PCs and workstations.'

Shading is handled externally by a program supplied with the surfaces option. To generate a shaded image, you select the view of the object as a wireframe in the editor and then invoke the Shade command. This allows you to set reflectivity, opacity and other characteristics for individual surfaces. A single command then sends the necessary data to a separate file that the shading program uses.

MicroCADDS Surfaces uses grey-scale shading on VGA rather than colour. Since grey scaling trades colour for higher resolution and smoother imaging, the resolution and appearance of the image is extremely good. This setup works extremely well for design visualisation.

The shading program also offers two modes for shading — faceted and smooth. Faceted shading is quicker than smooth shading because the smooth option generates a finer resolution. The only desired improvement here is to integrate shading within the graphics editor.

Computervision offers other optional modules for Personal Designer, including a Finite Element Analysis package and an extensive user program language called UPL. UPL offers a sizable toolkit of functions and programming facilities to manipulate graphic data, perform calculations, access disk files and more. With an extensive user-group network, finding

The increasingly widespread use of fast 386-based PCs with speedy processing and addressable high memory has affected the CADD arena. Our testing platform was a Compaq Deskpro 386/25 with a 60M hard disk, 4M of 32-bit system memory, a built-in cache controller and an 80387 numeric coprocessor; this is the kind of high-end platform one needs to run top-of-the-line CADD software optimally.

Our evaluations of CADD software emphasise their 3-D capabilities. We asked each reviewer to create a 3-D wireframe part model, a 2-D drawing of the model and a shaded rendering depicting the final product. If possible, the 2-D drawings were to be instanced off the wireframes; that is, pulled directly off of the earlier images. Not surprisingly, some 3-D packages don't support instancing — or they claim to support it but don't do it very well.

The mechanical part we asked our reviewers to draw was designed to test a package's functionality as both a 2-D and a 3-D drafting tool. In 2-D, to test dimensioning, we included several dimensions (lines, diameters and radii) in the drawing. We included an inclined surface with an intersecting cylinder to test the package's ability to deal with the resulting elliptical curve at the point of intersection, and to see how well the curved shape could be shaded. We added holes in the part's base to test 3-D surfacing capabilities. Had the base been totally solid, any program that could surface would have had no trouble. But with the holes present, several programs required the shaded base to be built from smaller pieces and then stitched together.

Our reviewers also tested the ability of each package to import .DXF files (the neutral file format defined by Autodesk) by reading in a 2-D drawing created in AutoCAD, Release 10. As a further test, we asked each reviewer to hatch a complex bordered region with a circular island in the centre (supplied as a .DXF file). Three years ago this test would have tripped up half the programs we reviewed. Today, most high-end packages pass without a hiccup.

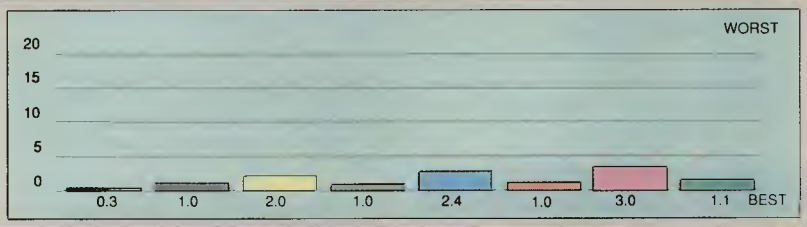
We also submitted each package to a series of speed tests measuring the time it required to regenerate a screen with a complex 2-D drawing displayed and to delete every entity on the drawing.

Performance tests: high-end CADD programs

Mass entity deletion

Elapsed time (seconds)

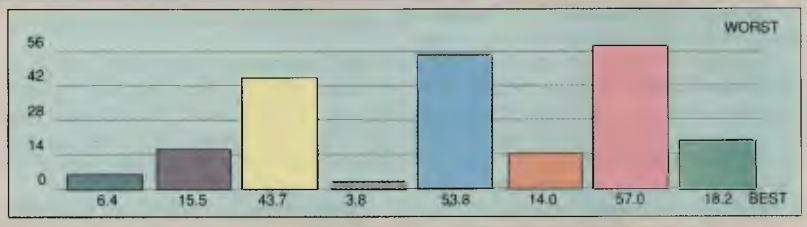
The **Mass entity deletion** test measures the time it takes to delete the entire top and front views of a multiview .DXF file. Stopwatch timing begins when the delete or erase command is invoked and ends when the areas have vanished from the screen



Entity select

Elapsed time (seconds)

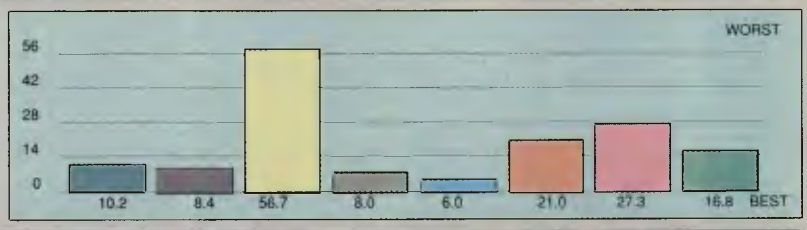
The **Entity select** test measures the time it takes to erase selected entities in a .DXF file using the Group Select procedure for each CADD package. Timimg begins when the delete command is executed and stops when the entities have been erased



Full-screen generation

Elapsed time (seconds)

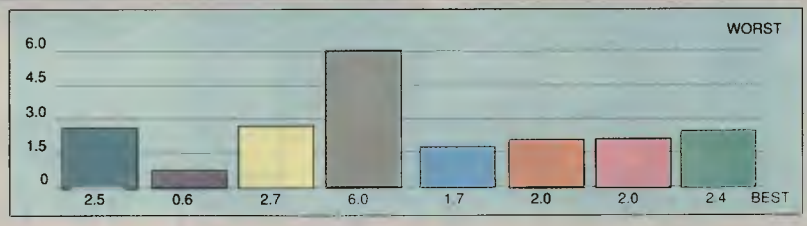
The **Full-screen generation** test measures the time it takes to redraw a two-dimensional .DXF file. For both screen generation tests, timing begins as soon as the first entity appears, and ceases when the last entity has been completely drawn



Select screen generation

Elapsed time (seconds)

A second display test, the **Select screen generation** test, measures the time it takes to generate a .DXF file of a select group of entities. Since some packages store virtual screens in memory and do not fully redraw the entities, the equivalent of REGEN rather the REDRAW (in *AutoCAD* terminology) is used



AutoCAD
Cadkey
DesignCAD
Drawbase 5000
MicroStation PC
Personal Designer
RoboCAD
VersaCAD/386

UPL programs already written to fit your special needs is easy.

Incorporated in the microCADDS GCD module of Personal Designer are .DXF and IGES translators. A DOS-extended version of microCADDS GCD for 386-based machines is available for $8280; you can also purchase versions designed for the Sun SPARCstation and 386i.

With Personal Designer, Computervision has combined ease-of-use and powerful surfacing to successfully bridge the ever-narrowing gap between PCs and workstations. If you need serious surface-modelling capability that's backed by one of the major players in the CADD game, this is the system for you.

RoboCAD

After trudging through command and menu-driven CADD software, it's a real treat to work with RoboCAD $1950 and RoboSolid $2000, two easy-to-use, icon-driven programs. As parts of Robo Systems International's modular package for design and analysis called RoboDesign, these products pack a lot of power for the engineer and drafter alike.

Both of the modules that are reviewed here include installation programs that make setting up directories, choosing devices and configuring the system a simple 10-minute job. This simplicity carries over into system operation as well, thanks mainly to the excellent design of the user interface.

RoboCAD and RoboSolid both offer pop-down menus and dialogue-box status lines, but the real spark comes from their icon menus. Nearly every command selected from the pop-down menus generates a combination of icons and dialogue boxes that can be moved to any point on the screen. A click of a mouse

Editor's choice

- **Cadkey**
- **MicroStation PC**

Cadkey is a full-featured winner no matter how you look at it, and the company is committed to keeping it that way. No other package offers the blend of 2-D functionality, 3-D versatility, and ease-of-use that Cadkey does.

AutoCAD remains the single best package you can get for 2-D mechanical drafting. But while its features in that realm are unsurpassed, it still has a few things to fix before it can be called the best 3-D package.

Our other choice is MicroStation PC, a powerful package that is pointing the way to the future of multi-user CADD. This is an extremely grown-up product, designed for use with multiple simultaneous access to files and data. There isn't anything you can't do with the program, except for 3-D Boolean solid operations. The extent of customisation available in MicroStation PC is unlimited. You'll find many ways to perform every function the package offers.

DesignCAD 3D offers many complex 3-D modelling functions at a much lower price than its competitors ($700), but inflexibility and lack of necessary features in its 2-D editor are drawbacks.

Drawbase 5000's ease-of-use, excellent drawing aids, and unmatched database facilities make it the state-of-the-art CADD system in the PC realm for architects and facilities managers alike. If its $7900 price is too high for you, CADworks has a number of stripped-down, less-expensive versions worth investigating.

Prime Computer of Australia Limited
(Incorporated in New South Wales)
Head Office: 156 Military Road,
Neutral Bay, NSW 2089
PO Box 542, Neutral Bay, NSW 2089
Telephone: (02) 908 1177

Versacad.
The Most Productive
Seat in the House.

Prime

THE RIBBON & DISK COMPANY

GENUINE PRINTER RIBBONS
WANG, FUJITSU, NEC, IBM, OLIVETTI, MICROLINE GENICOM.
3M DISTRIBUTORS
SCOTCH BRAND DATA CARTRIDGES
BLACK WATCH MAGNETIC TAPES & MARK Q DISKETTES.
TELEPHONE
(02) 970 6033

COMTRAD GROUP

COMPTRAD PC SYSTEM

- 80386 - 33
- 80386 - 25
- 80386 - 20
- 80386 SX
- 80286 - 16
- 80286 - 12
- XT

CHAPLET LAPTOPS

- HAIKAN LA - 30A
  OPTIONS: 20Mb/40Mb
  HARD DISK DRIVE
- HALIKAN LX - 20

CHICONY KEYBOARDS

- KB - 5191
- KB -5161
- KB - 5581

AS THE MEMBER OF A MULTI-NATIONAL ORGANISATION, COMTRAD GROUP,WE ARE EQUIPPED WITH A COMPLETE RANGE OF COMPUTER PRODUCTS READY TO BUILD ANY SYSTEM FOR YOUR PERSONAL CONFIGURATIONS.

ASK FOR OUR PRICES AND FEATURES.

Zylax

ZYLAX COMPUTER PTY LTD.

2/69 PRINCE WILLIAM DRIVE SEVEN HILLS N.S.W. 2147
TEL: (02) 624 8111 FAX: (02) 674 6567

INTERSTATE DISTRIBUTOR:
RAE INDUSTRILA ELECTRONICS PTY LTD.

SYDNEY
Century Plaza Building
Suite 6/41 Rawson Street
EPPING NSW 2121
Tel: (02) 868 3022
Fax: (02) 868 5676

MELBOURNE
218 Waterdale Road
(Cnr Beatty Street)
IVANHOE VICTORIA 3079
Tel: (03) 499 7322
Fax: (03) 499 4237

PERTH
Suite 1
6 Leigh Street
VICTORIA PARK WA 6100
Tel: (09) 470 270
Fax: (09) 472 3407

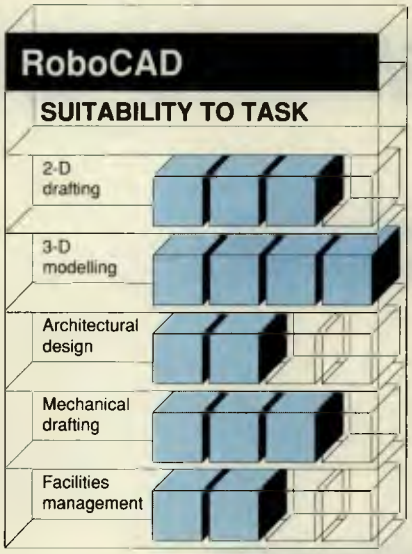
BRISBANE
Unit 8
121 Newmarket Road
WINDSOR QLD 4030
Tel: (07) 357 5355
Fax: (07) 857 3130

button sends them back into limbo when they are no longer needed. The icons help a novice become proficient in a short time without relying heavily on the tutorial or manuals. And an experienced CADD user could easily become productive in both 3-D and 2-D in a single day.

A winner in many respects

While RoboCAD doesn't have a few of the bells and whistles found in other CADD programs, all of the essentials are covered, and in some areas it really performs. The dimensioning features are probably some of the easiest to use of any CADD package. With everything controlled by icons and dialogue boxes, setting the style, terminator, text height and other variables is a dream come true for anyone who has ever struggled with AutoCAD's hideous dimvars. Any combination of dimension settings can be saved and retrieved as a whole with a single command. Selecting an icon option lets you locate dimension text anywhere along the dimension line, or completely off it if you wish. Setting tolerance and limit values is as easy as clicking an icon.

Text is an area where other packages could take a few pointers from RoboCAD.



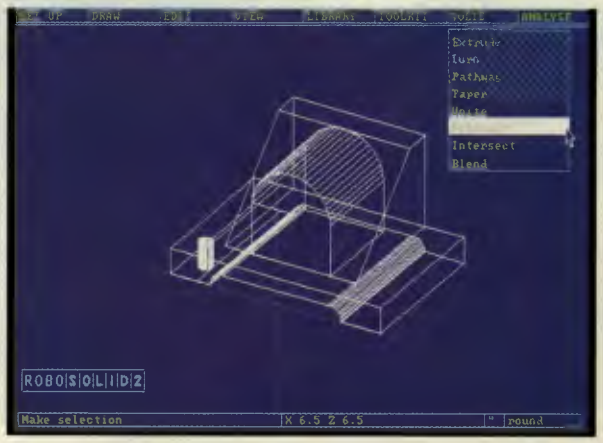
As with dimensioning, all variables are controlled by icons and dialogue boxes. Text is entered via a full-screen editor that offers complete cursor control and the ability to edit single or multiple lines of text. When you are finished entering your text it's attached to the cursor for dragging into position. After the first placement the text is retained on the cursor and can be placed at other locations in different fonts, sizes and slants, or even isometrically by clicking the appropriate icon to change the setting. Existing text can then be revised by using the editor.

A host of other easy-to-use but powerful features exist to let you do almost anything else you can think of in 2-D. These include an HPGL-to-RoboCAD translator, which provides an efficient way to translate data between dissimilar systems that are not usually on speaking terms.

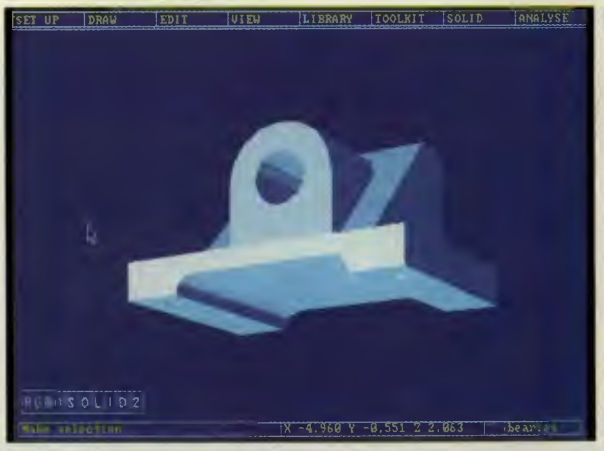
Of course no program is perfect, and RoboCAD is not an exception. Without enough extra memory to contain the entire program, the system can be slow because it becomes heavily disk-intensive. Also, basic features, such as associative dimensions, creation of polygons and automatic trimming of lines after fillet and chamfer, are missing. The package also lacks some of the instant point snaps, like midpoint and quadrant, that make drawing construction a much simpler task. The next release — RoboCAD 20, due soon — will not only address those areas but will go well beyond, offering multiple DOS windows, keyboard commands, timed auto-save, networking support, an integrated drawing control system and an integrated, full-featured word processor.

A solid package

For creating solid models, RoboSolid offers the same ease-of-use as RoboCAD. One of the most important features is RoboSolid's ability to display a model with



RoboCAD's optional $ RoboSolid module is essential for creating and shading 3-D images. Here, the test part is being built prior to shading



In this view, RoboCAD's RoboSolid module has re-oriented the finished, shaded 3-D part so that it can be seen from below. This is the real value of shading

At a glance

RoboCAD

Distributor:	Perseus Systems
Telephone:	(03) 578 3737
Price:	RoboCAD, $1959; solid modelling module (RoboSolid), $1800; both programs, $3750
Requires:	640K of RAM, DOS 3.0 or later; mouse or digitising tablet and Intel 80x87 numeric processor recommended
In short:	RoboCAD's excellent interface and ease-of-use make modelling and drafting a simple pleasure. It offers a number of advanced utilities that AutoCAD has yet to even consider.

FORMOSA COMPUTER

FA88 XT SYSTEM

- 8088-1 cpu 4.77/10 MHZ
- 640 KB RAM
- 360 KB FLOPPY DRIVE
- MULTI I/O CARD (SERIAL/PARALLEL/GAME FDD CONTROLLER/CLOCK BUILD- IN)
- 101 KEY KEYBOARD
- POWER SUPPLY & CASE

$739 INC. TAX

FA 286 AT SYSTEM

- 80286-12 CPU 8/16 MHZ
- 1MB RAM
- 1.2 MB FLOPPY DRIVE
- SERIAL/PARALLEL/GAME
- FDD CONTROLLER
- 101 KEY KEYBOARD
- POWER SUPPLY & CASE

$1139 INC. TAX

FA386-SX SYSTEM

- 80386-SX 16/20 MHZ
- 1MB RAM
- 1.2 MB FLOPPY DRIVE
- SERIAL/PARALLEL/GAME
- HDD/FDD CONTROLLER
- 101 KEY KEYBOARD
- POWER SUPPLY & CASE

$1519 INC. TAX

FA386-20 SYSTEM

- 80386-20 20/32 MHZ
- 1MB RAM
- 1.2 FLOPPY DRIVE
- SERIAL/PARALLEL/GAME
- HDD/FDD CONTROLLER
- 101 KEY KEYBOARD
- POWER SUPPLY & CASE

$2099 INC. TAX

MAINBOARD

- XT 4.77 MHZ O/K $125
- AT 286 12/16 MHZ O/K $270
- NEAT 286 12/20 MHZ O/K .. $450
- 386-SX 16/20 MHZ O/K $700
- 386-20 20/32 MHZ O/K .. $1100

FLOPPY DRIVES

- 360 KB 5 1/4" $120
- 1.2 MB 5 1/4" $140
- 720 KB 3.5" $129
- 1.44 MB 3.5" $140

HARD DISK DRIVES

- 20 MB 65 MS $340
- 40 MB 28 MS $598
- 44 MB 28 MS $630
- 120 MB 28 MS ..... $CALL
- 160 MB 28 MS ..... $CALL

CONTROL CARDS

- FDC-1 ..... $80
- HDC-1 ..... $90
- HDC/FDC MFM $170
- HDC/FDC 1:1 ..... $190

CABINETS

- BABY CASE $90
- MINI TOWER (S) $150
- MINI TOWER (M) $190
- TOWER $250

KEYBOARD

- 101 KEY KB **$90**

POWER SUPPLY

- XT 150 W $105
- AT 200 W $119
- AT 220 W $150

MONITORS

- 14" DUAL MONO $169
- 14" COLOUR (CGA) .... $CALL
- 14" COLOUR (EGA) $550
- 14" COLOUR (VGA) $598
- 14" MULTISYNC $799

DISPLAY CARDS

- MGP $85
- CGA $72
- CGP $72
- EGA (640 x 480) $158
- EGA (800 x 600) $228
- VGA (800 x 600) $268
- VGA (1024 x 768) $398

ADD ON CARDS

- XT MULTI I/O $129
- PRINTER CD $20
- SERIAL/PARALLEL $70
- 2S/PARALLEL/GAME $78
- GAME CARD ..... $CALL
- IEEE-488 CARD ..... $CALL
- RS 422 CARD ..... $CALL
- FAX MODEM CD ..... $CALL
- INTERNAL MODEM .... $CALL
- 2400 EXTERNAL MODEM ..... $CALL
- 12 BIT AD/DA CD ..... $CALL
- PAL PROGRAMMER .. $CALL
- EPROM WRITER ..... $CALL

MOUSE & GENISCAN

- GM-6 ..... $45
- GM-6 PLUS $69
- GM-6000 ..... $73
- GM-F301 ..... $95
- GM-1212A DIGITIZER ..... $CALL
- GS-4500 GENISCAN (COMPLETE WITH OCR SOFTWARE) $450

MATH CO-PROCESSORS

- 8087-1 (XT) ..... $CALL
- 80287-10 (AT) ..... $CALL
- 80387-20 ..... $CALL
- 80387-SX ..... $CALL

MEMORY

- 4164-15, 12 ..... $CALL
- 41256-8, 10, 12 ..... $CALL
- RAM MODULE ..... $CALL

ACCESSORIES

- JOYSTICK
- DISK STORAGE BOX
- PRINTER STAND
- COPY HOLDER
- DISK CLEANING KIT
- SCREEN FILTER
- CPU STAND
- MONITOR STAND
- KEYBOARD DRAWER
- MOUSE PROCKET
- COMPUTER TABLE
- DUST COVER ..... $CALL

DEALER ENQUIRIES WELCOME

FORMOSA AUSTRALIA PTY LTD.
P.O. BOX 561 SUNNYBANK QLD 4109 AUSTRALIA
12 CHARTREUSE ST. SUNNYBANK HILLS. BRISBANE.
TEL: (07) 273 3505 FAX: 61-7-273 7492

* ALL PRICES INCLUDE SALES TAX AND MAY BE SUBJECT TO CHANGE WITHOUT NOTICE
* ALL PRODUCTS ONE YEAR WARRANTY
* DELIVERY CHARGE FOR BUYER

MasterCard VISA

INTELLIGENT ADVANCED COMPUTERS

DEALERS ENQUIRIES WELCOME

IAC computers are fully assembled and tested in Australia using the latest technology. When others are trying to push to you outdated slow 10MHz XT and 12MHz ATs. We, at IAC are bringing to you much faster computers but at no higher prices.

.XT/286 - Uses 80286-10 CPU hence performs like an AT running at 12 MHz(LM) or comparing to a standard 4.77MHz XT it is 7.7 times faster. It is fully compatible with all PC/XT softwares and add on cards.

.IAC AT - Uses 80286-16 CPU running at 16 MHz clock giving a Landmark speed of 21 MHz. It outperforms most competitors slow 12MHz machines.

.IAC 386SX - This machine has been reviewed in the October issue of APC magazine as one of the best buys in terms of price and performance.

.IAC 386/33 - High performance computer at an affordable price. Includes 32K of fast ache memory, memory can be upgraded to 4M on board or 16M with extra memory board.

(LM - Landmark Speed Test)

ALL COMPUTERS COME WITH 12 MONTHS FULL WARRANTY. NATION WIDE ON SITE WARRANTY BY AWA ARE ALSO AVAILABLE.

Model	CPU	Speed MHz/LM	Memory/ Expand	Hard Disk Drive	Floppy Drive	Serial/ parallel/game	Expansion Slots/free	Computer Only	Mono * System	EGA System	VGA System
IAC XT/286	80286-10	6/31	640K	20M	360K	1/1/1	8/5	$1300	$1450	$2050	$2150
IAC XT/286	80286-10	6/31	640K	40M	360K	1/1/1	8/5	$1450	$1600	$2200	$2300
IAC AT/20	80286-16	16/21	1M/4M	20M (65ms)	1.2M	1/1/1	8/5	$1595	$1745	$2195	$2295
IAC AT/40vc	80286-16	16/21	1M/4M	40M (28ms)	1.2M	1/1/1	8/5	$1845	$1995	$2595	$2695
IAC 386/SX	80386SX	16/20	1M/8M	40M (28ms)	1.2M	1/1	8/5	$2295	$2445	$2995	$3195
IAC 386/33	80386-33	33M	1M/4M	40M (28ms)	1.2M	1/1	8/5	$3750	$3900	$4500	$4600

*** System includes computer, monitor and appropriate graphics card.**

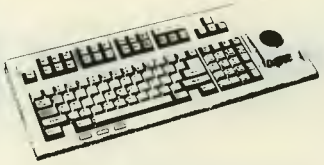
Each complete system includes an enhanced 102 Keys keyboard, full set of manuals and is backed by our Technical Hotline Support. For those who need DOS, our special price of latest MS DOS 4.0 at only $99 with system purchased. During the month of May, extra gifts of wordprocessor, spreadsheet, database, computer tutor, games will be given free for all systems purchased.

Many Models Avail.

Model UK11

Model UK190

$179



Keycat Keyboard

- Genius Scanner $360
- OKI ML390 $850
- Star NX1000 Colour $525
- Star NX15 $639
- Epson LX800 $374
- Genius Mouse w'paint $119
- VGA card $225
- EPSON LQ 500 $575
- Attache accounts $888
- 3 1/2" 720K drive $165
- 3 1/2" 1.44M drive $185
- VGA monitor (Multisync) $795

HEAD OFFICE
COMPUTER SUPERMART
888 NORTH ROAD,
BENTLEIGH EAST, 3165
PHONE: (03) 570 1668
FAX: (03) 563 8338

EVERTECH COMPUTERS
SUIT 3, 34 CAMPBELL STREET
BLACKTOWN 2148, NSW
PHONE: (02) 831 1011

DATAPARTS WHOLESALE
3B/7 Union Street
Stepney S.A. 5069
Phone: (08) 363 2733

EXECUTECH COMPUTERS SUPERMART
Suite 3, 20 Leura Street,
Nedlands W.A. 6009
PHONE: (09) 386 7753

All prices include sales tax
All computers carry one year full warranty
Add $20 freight for each computers, monitors, printers
Add $10 for small items not over 3kg
Specifications and prices are subject to change without notice. E & OE

Caddsman

A wireframe and solid image of a micro-irrigation dripper (a kind of sprinkler) produced by Caddsman

Little known outside South Australia, Cadd sman is an excellent 3-D CADD package that has been around since 1987 and is being widely used in South Australian schools and businesses.

Besides being 3-D, the major attraction of Caddsman is the integration of the core product with a number of modules, all sharing a common interface.

The eight additional modules are an animation module, a finite element mesh generator, an architect's module for producing initial architectural sketches and working drawings, a machinist module and other modules aimed at electrical, structural, pneumatic and hydraulic engineers.

Because of the modular approach, Caddsman can also cope with all aspects of the CADD market, from initial marketing conceptualisation to animated flythroughs of designs. Caddsman has 860 primary commands as part of its application programming language. The 2-D and 3-D views can have up to 1000 layers, hidden lines and shaded views.

The 3-D models are calculated to double precision, 12 decimal place accuracy and can be stored as PostScript or SCODEL images, for output as slides. Multiple 2-D models can be created for plotting on a single sheet of paper.

Other attributes are screen or tablet menus, an undo function, a walk-through facility, user-definable text fonts, a database and bill of materials extraction facility, automatic file saving, area, volume and mass calculations. Internal file management processes let model databases be created, merged and deleted, with sub-figure updating automatically updating the database.

The application has its own macro language and a Pascal-based programming language called Application Programming Language, or APL. With APL, users can have Caddsman automatically generate models based on a question and answer session.

Caddsman runs under MS-DOS on both 286 and 386 platforms with EGA or VGA graphics, numeric coprocessor and a mouse. A 286 licence costs $3995; a 386 licence is $7200, and the PC needs 4M of RAM.

Kester Cranswick

hidden surfaces dashed, and then export that view to RoboCAD for 2-D detailing. This saves a substantial amount of drafting time.

Since RoboSolid is intended as a solid rather than surface modeller, complex modelling of double-curved and twisted surfaces is not included. However, many extremely complex forms can be created by extruding different views of an object and letting RoboSolid calculate their intersection. Profiles can be created in RoboSolid or imported from RoboCAD and then extruded, turned, tapered or projected along a multi-directional, non-linear path. Boolean functions for uniting, subtracting, intersecting and blending solids are as simple as selecting a single command.

RoboSolid provides four viewing styles: wireframe, hidden lines removed, hidden lines shown dashed or shaded. The image can be changed from perspective to isometric projection at any viewing angle in any of those modes. Light-source location, intensity and depth-cueing are controlled by sliding bars. Solids can be mirrored or sectioned, with sections exportable to RoboCAD in 2-D. And when mass properties are needed, weight, volume, surface area, CG, moments of inertia and products of inertia take only seconds to calculate.

With additional memory or a virtual disk to cut down on disk access, the program models and repaints very quickly — you won't have time to make a trip to the coffee machine or call a friend while waiting for it to finish an operation. All of RoboSolid's features and ease-of-use combined to make creating the test model and exporting it to 2-D a painless 15-minute process.

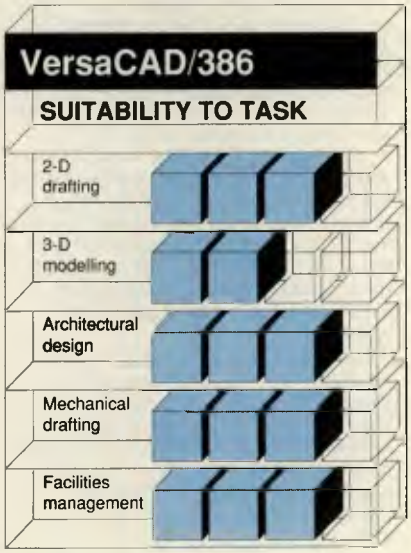
If you're looking for a modeller to paint beautiful, photo-realistic images on your screen, look elsewhere. That's not what RoboSolid is all about. After all, the result you're after and the one RoboSolid provides is usually an accurate 3-D representation — not gratuitously impressive-looking images that take hours to produce and have absolutely no impact on your profit margin.

What else does the RoboDesign system offer? Availability in 20 languages, bills of material, time management and reporting, and wonderfully simple font customisation — it's all in the package. With integrated surface modelling and finite-element analysis on the way, RoboDesign could even make a dyed-in-the-wool AutoCAD fanatic sit up and take notice.

VersaCAD/386

VersaCAD/386 is the newest member of VersaCAD's family of computer-aided drafting and design products. Designed to take full advantage of the 80386 processor,the $5825 program remains fully compatible with its predecessors while providing increased performance. As a 2-D drafting system, VersaCAD/386 has a full array of features that are comparable to those of any PC-based CADD package. As a 3-D modeller it is a workable system, but with some limitations.

The system is modular in design; a shell program controls access to the Drafting (2-D), Modelling (3-D), Bill of Materials, QuickRender, Output Utilities, Translators, Customisation and Environment modules. Files can be transferred between the different modules. A CADD program-



ming language (CPL) is available for customising the system, as are fully configurable menus and a learn mode for creating tablet and function-key macros.

Up and running

A QuickStart pamphlet provides all the information required to perform the installation. If you load all modules, be prepared to give up about 8M on your hard disk. Once installed, the configuration may be reviewed and modified at any time.

The only disconcerting part about the installation is that it requires you to enter a workfile size, which determines the maximum number of objects in any one drawing. Too low a value and you are limited to small drawings. Too high a value introduces unnecessary overhead.

The QuickStart pamphlet's tutorial, intended to get a novice started, proved to be frustrating because it provided several faulty descriptions. The most notable was when I attempted to load a symbol for a door and a toilet appeared on the screen!

Communicating with VersaCAD is not easy, especially for a new user. Most functions are available from the on-screen menus, but some are available only from the function keys or numeric keypad. The use of a digitising tablet makes most of these problems disappear, but with a mouse, moving among menus can be frustrating. The highlight bar stays at the same screen position from one menu to another. If the new menu contains fewer items than the previous one, the highlight bar disappears completely. If the cursor is moved out of the graphics area during object modification or group selection, there is no way of determining which object is the currently selected one.

At a glance

VersaCAD/386

Distributor:	Prime Computer
Telephone:	(02) 968 9200
Price:	$5825
Requires:	3M of RAM (1M conventional and 2M extended memory), 80386 processor, numeric coprocessor, DOS 3.0 or later. Mouse or digitising tablet recommended
In short:	VersaCAD's somewhat clumsy user interface, the separation of its 2-D and 3-D modules, and its limited surfacing capabilities detract from an otherwise sound system. The drafting module offers a wide range of dimensioning capabilities, while the modelling module is capable of producing impressive displays — if you put in the work.

But perhaps the most frustrating characteristic of the user interface is that it gives you two ways of exiting a menu: Quit and Esc. These options are next to each other in the menu, and it is very easy to inadvertently choose Esc instead of Quit — with the result being that all objects created with that menu disappear forever.

On the plus side, VersaCAD has probably the most complete set of options for selecting a group of objects of any CADD system.

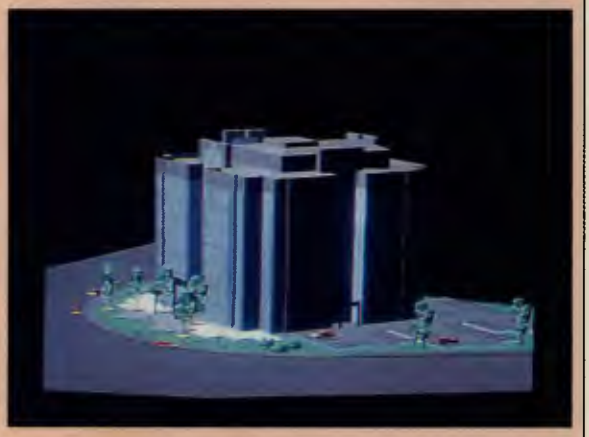
VersaCAD in action

The 2-D drawing of the test part was created without difficulty.

The 2-D drawing could also have been created by building the 3-D model first and then transferring the orthographic views from the Modelling module back to the Drafting module. However, this approach has a distinct disadvantage. Everything from the 3-D modeller transfers back as facet edges (lines); thus, dimensioning is complicated and the design intent is lost. It takes additional time to remove the undesired lines. In some cases, a combination of creating 2-D geometry and extracting views from the 3-D model will prove to be the best solution.

Creating the 3-D model of the test part

QikDraw



An image of an office block on Anzac Highway, Adelaide, completed using Qikdraw

QikDraw Systems, also based in Adelaide, has received wide recognition for its CADD products, with over 700 users throughout Australia, Asia and Europe. Its software won an Australian Design Award in 1987 and has been developed to cater for vertical markets such as the steel industry, building and computer-aided manufacture.

The 2-D and 3-D QikDraw modules are aimed at the general CADD market. Both have similar features, headed by a display that makes extensive use of menus and submenus. The interface is designed to make the product easy to learn and use. In fact, the developers claim their interface lets new users become fully productive in a week.

QikDraw has strong security — users have their own passwords and sessions are logged as they occur. In the event of a system failure, sessions can be replayed to recreate the lost work, which is also a useful means of restoring drawings to an earlier condition. A simple undo feature is provided as well.

Drawings can be constructed from up to 120 sub-drawings, which have the same function as layers in other CADD systems. Changing a sub-drawing alters the drawings it forms a part of.

Other noteworthy features include rectangular or circular windows, zooming, panning and rotating of objects, and a large range of standard or user-defined symbols. The menus make choosing hatch patterns and line thicknesses an intuitive process.

Qikdraw can interact with other programs via text files. Interfaces to packages such as Aces, Bunyip, Camel and utilities to read and write IGES or .DXF files are available. Opal, a graphical language interface, is another option.

QikDraw runs on any XT or better PC with EGA graphics, numeric coprocessor and a mouse. Version 3.22 is for 640K PCs and costs $4000. Version 4 handles up to 4M of RAM and costs $5000. Prices include both 2-D and 3-D components.

Kester Cranswick

THE CBA BUSINESS PACKAGE KEEPS GETTING SMARTER AND SMARTER.

There are two reasons for the increasing smartness of the CBA Business Package. The first reason is that there are now 15 modules which can be incorporated into your CBA Business Package as your business grows. Secondly, CBA is constantly being researched and developed. If you are the holder of a CBA Upgrade Policy, you will be sent these upgrades regularly (at least once a year).

That means that your CBA Business Package will always be state-of-the-art. And that means you look smarter and smarter. If you would like further information, please fill in this coupon and send to: Automation One Pty. Ltd., 27 Palmerston Crescent, South Melbourne, Vic. 3205. Or phone the Automation One team on 008 331 198 or (03) 6962635.

We're in most capital cities.

Name: _____

Company: _____

Your Title: _____

Company Address: _____

P/code: _____ Tel.: _____

AUTOMATION ONE.
The business software specialists.

AUT062

Pro/ENGINEER *"The Designer's Dream"*

- Dimension driven, feature-based solid modelling
- Object orientated database
- Parametric design of complex assemblies
- Automatic fem mesh generation
- Two-way associativity between models and their drawings
- Co-existence with traditional CAD systems

Productive use of solid models for everyday use

INTERCAD

5th Floor, 10 Help Street Chatswood NSW 2067, PO Box 1011 Chatswood NSW 2057

Tel: (02) 410 9852 **Fax: (02) 413 3620**

FREE INFO 151

was a chore. The approach taken was to assign thicknesses to various portions of the 2-D drawing and then transfer this data to the Modelling module. However, if the cross section being extruded contained holes, the top and bottom surfaces weren't trimmed accordingly. To get the correct representation, I had to create a patchwork of surfaces by hand, using the edge points of the extruded surfaces. This was a tedious and error-prone task. Once it was finished, though, a shaded display and hidden-line-removal display were created with ease.

"One of VersaCAD's strengths is its ability to display up to 16 viewports with any combination of wireframe hidden-line, shaded, orthographic and perspective views."

One of VersaCAD's strengths is its ability to display up to 16 viewports with any combination of wireframe, hidden-line, shaded, orthographic and perspective views. However, it can be difficult to get the desired orientation of a view without calculating a position for the eyepoint. To avoid this problem you can load the file into QuickRender. Strictly a viewing utility, QuickRender allows up to four light sources and up to four simultaneous views to be positioned, manipulated and rendered with a myriad of options.

The testing of the .DXF translator produced mixed results. Reading in the .DXF file produced a drawing without a single dimension. However, in a loop test of the same drawing created with VersaCAD, the drawing was successfully written to and read from the .DXF format without any loss of data.

The system also has an IGES translator and a VLINK utility for moving files between the different hardware platforms VersaCAD supports. VersaCAD was able to easily crosshatch the test file by simply selecting all of the geometry and executing the hatch command.

With more than 80,000 users, VersaCAD is an established player in the PC marketplace. However, its performance, though solid in 2-D drafting, could use some improvement in the area of 3-D modelling. Like any high-end CADD package, the product demands a substantial investment in hardware and software, and that investment may be practical only for larger organisations with a vested interest in using the same system across a wide range of platforms and applications.

END

Generating this shaded view with VersaCAD/386 is relatively easy, but getting the necessary information from 2-D to 3-D format is a bit of a chore: it required some manual patching in this case

This screen shows the results of importing a supplied .DXF file into VersaCAD/386. Like many other programs, VersaCAD lost the dimensioning details during the process

FastCAD
Fastest PC-CAD available

EasyCAD2
Low cost, high performance

- Completely written in assembly language for maximum speed.
- Up to eight simultaneous active windows
- Pull-down menus and on-screen icons for ease of drawing control.
- On-line help and control dialog boxes
- Programmable macros, scripts and external procedures for application development

Phone, Fax or Write for FREE DEMO DISK

AltPro SYSTEMS

Ph. (03) 528 3050 Fax (03) 330 1413
27 Bridge Street
Elsternwick Vic. 3185

What would happen if your hard disk broke down?

You wouldn't be able to sell anything, you wouldn't be able to access information, your customers would start shopping around, half your staff would spend their valuable time drinking coffee because they couldn't work and, when you finally got it repaired, it would take days to catch up.

Shouldn't you get a Maxtor now!

You'll be glad you put reliability first.

Maxtor

Engineered for endurance, designed for performance. With a 2-year Warranty, Maxtor Hard Disk Drives are available in the following interfaces and formatted sizes.

ESDI 150, 320, 650MB	SCSI 150, 200, 320, 650MB
OPTICAL WORM & Erasable	ST 506 70, 120, 160MB

Want to avoid a breakdown? Contact us today.

SKI PERIPHERALS

OFFICIAL AUSTRALIAN DISTRIBUTOR:

HEAD OFFICE:
45 Albert Street, Abbotsford, Vic. 3067.
Tel: (03)4292611. Fax: (03)4160596.

SYDNEY OFFICE:
30 John Street, Lidcombe, N.S.W. 2141.
Tel: (02)6491222. Fax: (02)6492022.

A division of the United Computer Group Ltd.

Approaching the Speed of Mind

SKI/M1

Suppose You Protected Your Software & The Silence Was Golden.

Software protected by Rainbow Technologies' Software Sentinel™ has a sound of its own: Golden. And unlike copy-protected software, very silent.

Golden because your development investment is protected. Down to each and every copy you sell. To give you the long-term solution to revenue loss. And the sure way out of the worldwide free-distribution network.

Silent because Software Sentinel protection is transparent. With easy-to-live-with reliability. And no impact on the user or your software's performance. Which means all you hear are the nods of approval.

The Software Sentinel key is shipped with the software and easily installed on the PC's printer port. Protected software will run only when it's installed. No key – No use. It's that simple.

Key Sentinel Family Features.

▫ "Execution control" technique prohibits unauthorized use of software ▫ Permits unlimited backup copies ▫ Virtually unbreakable ▫ For DOS, OS/2 and XENIX ▫ Pocketsize – Transportable ▫ Transparent operation ▫ Use with a hard disk

SentinelPro™

- Runs under DOS, OS/2 and Xenix, on IBM PC/XT/AT, PS/2 and compatibles, and Atari ST
- Algorithm technique (Never a fixed response)
- Parallel port version
- Minimal implementation effort
- Higher level language interfaces included
- 100 times faster than fixed-response devices (1ms)
- ASIC design for reliability

Sentinel-C

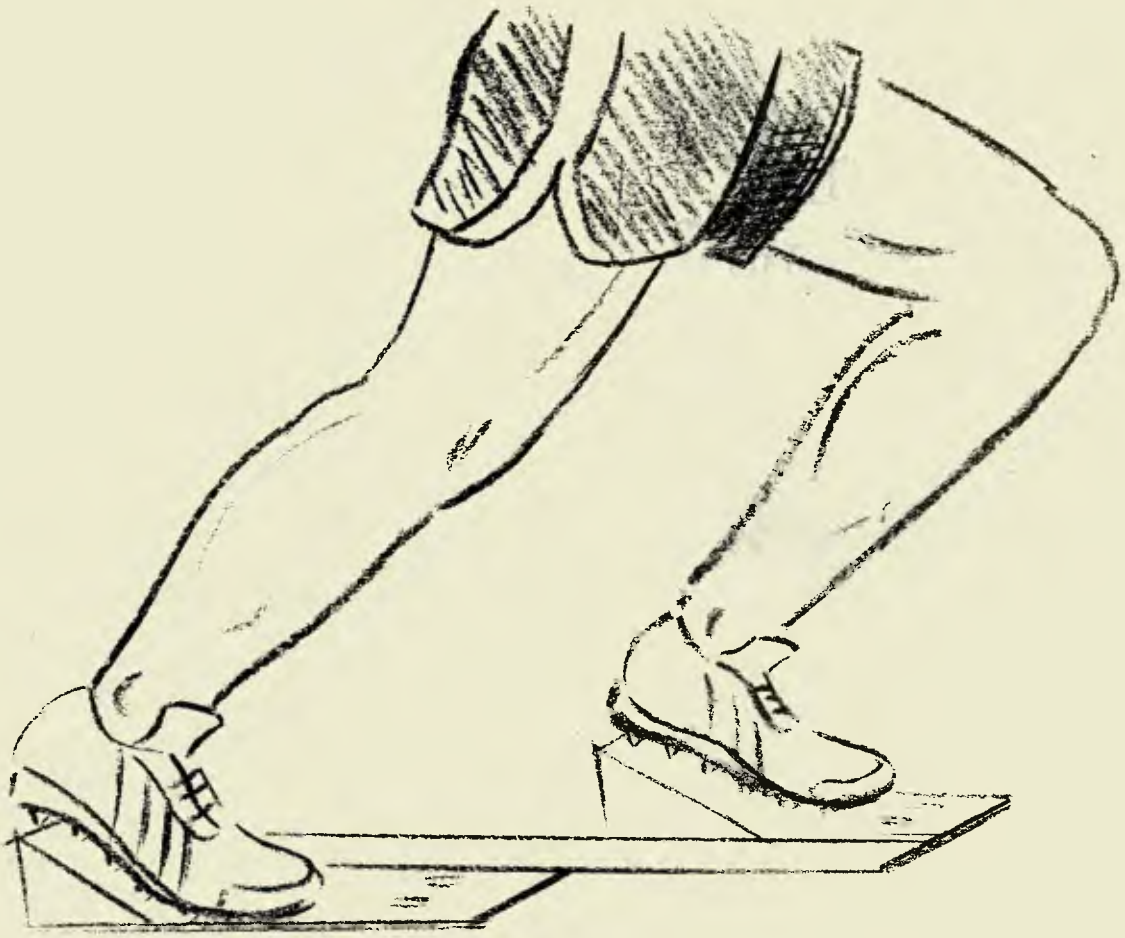
- Protects multiple packages with one device
- 126 bytes of non-volatile memory programmed before shipment of the software
- Rainbow supplies the developer a unique adapter for programming the unit
- Higher level language interfaces included
- Runs under DOS, OS/2 and Xenix, on IBM PC/XT/AT, PS/2 and compatibles
- Parallel port version

Evaluation kits available.

FMS

Fagan McFarling Systems Pty Ltd.
96 Canterbury Road,
Middle Park, Vic. 3206
Ph: (03) 699 9899
Fax: (03) 699 7501

•EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX •



With the world's fastest computer, you can leave your competition where we've left ours.

If you want to get ahead then it helps to include the fastest in your team.

EVEREX STEP

That's why it makes sense to choose Everex Step. The fastest personal computers available, they'll give you the edge to perform to the limit.

As with everything Everex undertakes, this new range has been given the upmost care and attention. With 25% of our current 1900 worldwide employees comprising solely of engineering/research staff, we ensure winning design solutions everytime.

Step are the world's first PCs to incorporate Advanced Memory Management Architecture (AMMA) and have taken the computer industry by storm. Developed exclusively by Everex from mainframe technology, AMMA is the key to Step's speed and success.

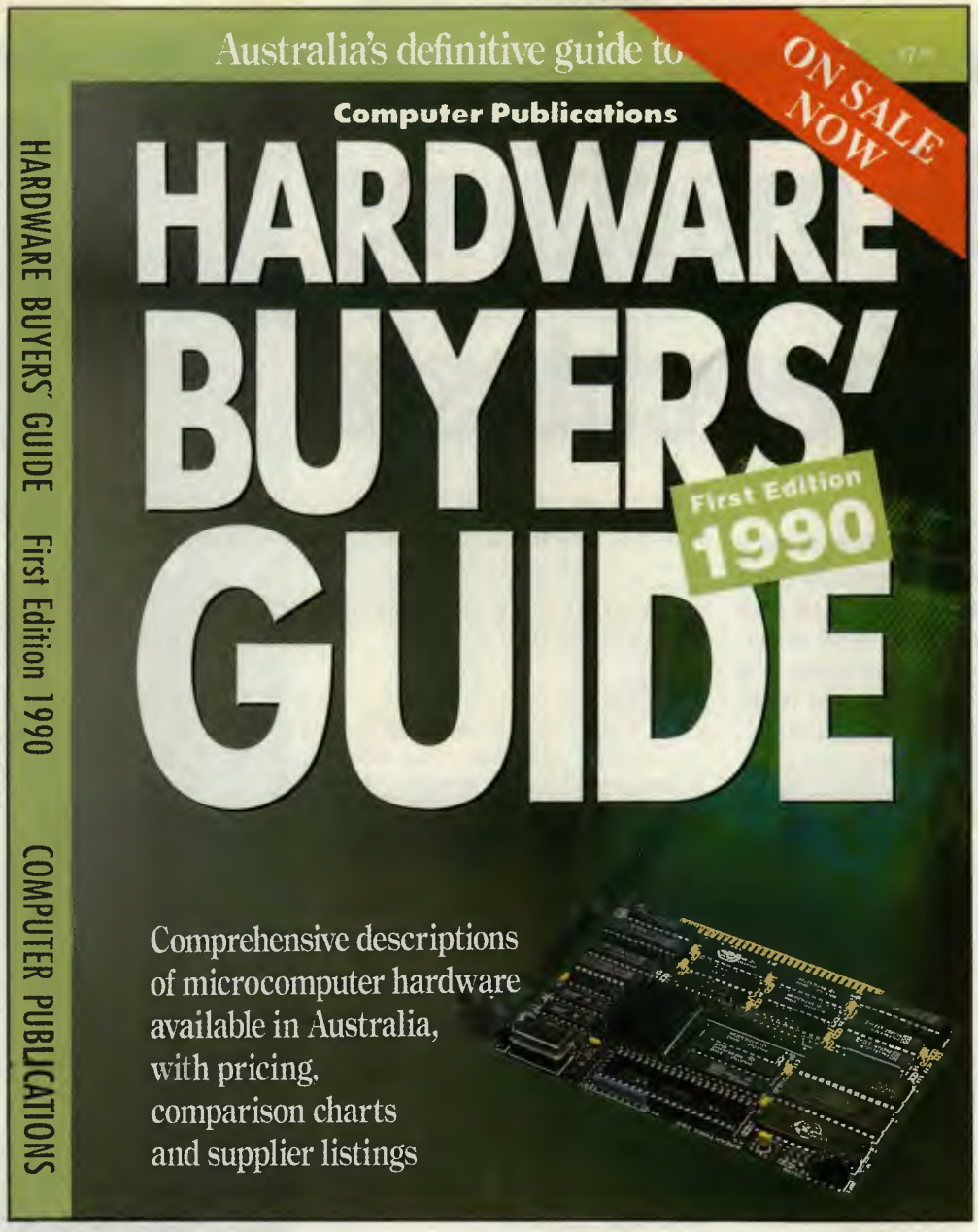
Ideal for scientific and multi-user applications, if you're quick off the mark, Everex Step will push your company forward, whilst others still remain on the starting blocks.

EVEREX
EVERforEXcellence

Tel:(02)4276111 Fax:(02)427 5948

Australia Everex Systems Pty Ltd Unit 6, 12A Mars Rd. Lane Cove, N.S.W. Australia. 2066.

•EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX • EVEREX •


Australia's definitive guide to
ON SALE NOW
Computer Publications
HARDWARE BUYERS' GUIDE
First Edition 1990
COMPUTER PUBLICATIONS
HARDWARE BUYERS' GUIDE
First Edition 1990
Comprehensive descriptions of microcomputer hardware available in Australia, with pricing, comparison charts and supplier listings

30% MORE PRODUCTS

Order your copy of the *Hardware Buyers' Guide 1st Edition 1990*. Clearly indexed and divided into clear product categories the Guide helps you make the best purchasing decision for your organisation.

Save 20% if you order the Hardware and Software Guides together.

Please send me
- ☐ Hardware Buyers' Guide 1st Edition 1990 $7.95
- ☐ Software Buyers' Guide 1st Edition 1990 $7.95
- ☐ Hardware and Software Buyers' Guides $12.75

Special offer Save 25% if you order your second editions now.
- ☐ Hardware Buyers' Guides 1st & 2nd Editions $11.90
- ☐ Software Buyers' Guides 1st & 2nd Editions $11.90
- ☐ 1st & 2nd Hardware & 1st & 2nd Software Buyers' Guides Editions $24.00

(2nd Editions available July 1990.)

I enclose a cheque for $..... or bill my

☐ Amex ☐ Visa ☐ Diner's ☐ Mastercard ☐ Bankcard

Number ..... Expiry date .....

Authorising Signature .....

Post to: Freepost 38, Buyers' Guide, Level 17, Plaza II, Bondi Junction Plaza, 500 Oxford Street, BONDI JUNCTION NSW 2022. (No postage stamp required.)

Name .....

Company Name .....

Address .....

..... Postcode .....

Telephone ..... Date .....

Signature .....

486 machines eat benchtests

PC manufacturers are blazing ahead producing systems that use the faster than fast 486 chip. Many have been released in the US, and are now trickling to Aussie shores. Neale Morison tries six machines out for size.

The 486 chip is yet another in the long line of Intel 8086-compatible chips. It's compatible with the 386 processor, so software that runs on the 8086, the 80286 and the 80386 runs on the 80486; this includes all MS-DOS software. The 486 contains some enhancements, including an on-chip cache memory, an on-chip 487 numeric coprocessor and RISC (Reduced Instruction Set Computer) design techniques so that frequently used instructions execute in one cycle. While the overall number of possible instructions is greater, the speed has been increased by reducing the complexity of the instructions most often used.

The 386 chip requires an average of about four and a half clock cycles per instruction. The 486, on the other hand, requires an average of about two and a half clock cycles per instruction, so that for the same clock speed, the 486 can perform much faster than the 386.

486 PCs

486 machines have a similar design to 386 machines. They have either a 24-bit AT bus or a 32-bit EISA bus (see below), and often some caching in fast RAM on the motherboard, in addition to the on-chip caching, to compensate for the slowness of the rest of the motherboard RAM.

Can you put a 486 chip in a 386 board? No, the 486 is a big chip, with more pins than the 386. However, compromises are possible. The ASI's AMI motherboard, for example, has a special circuit board containing the 486 chip, which plugs into the motherboard 386 socket.

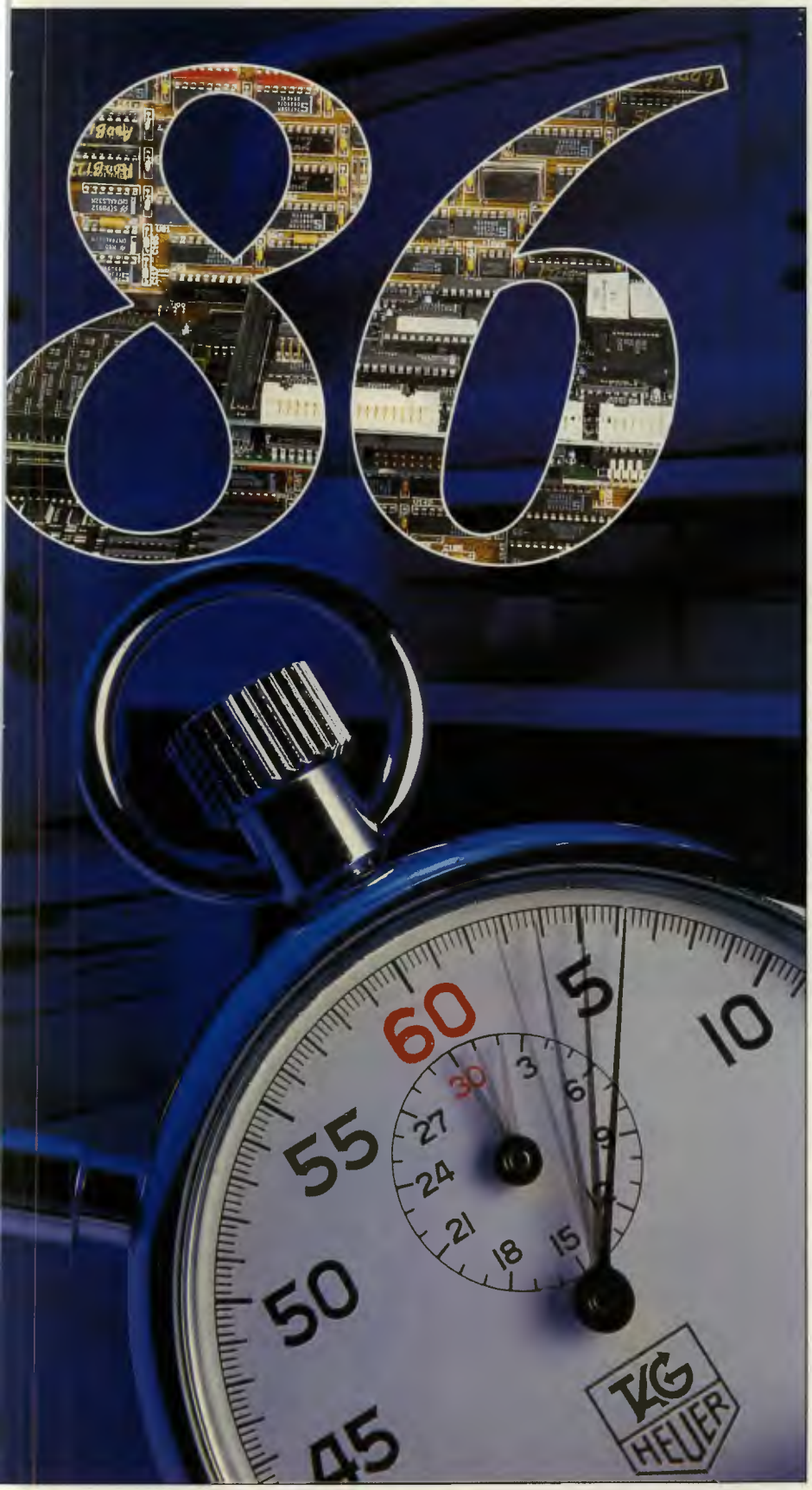
EISA

The Extended Industry Standard Architecture — a standard developed by a group of hardware companies including Intel, AST Research and Compaq — is a newly emerging alternative to the IBM Micro Channel bus used on IBM PS/2 models. It carries the flag onward from the AT bus, or ISA (Industry Standard Architecture), allowing the use of your old AT bus boards, but adding new EISA boards with the capacity for faster data transfer.

The EISA bus has many advantages over the AT bus. It has more address lines, so given the right operating system you can address more system memory. The AT bus has 24 address lines, addressing a maximum of 16M. The EISA bus has 32 address lines, addressing up to 4G (gigabytes).

EISA cards can share interrupt lines, which means you can expand your EISA system with more add-on cards. The EISA bus also allows a plug-in card to take control of the computer, which is useful if you want to add in another processor.

Data transfer is the big winner for the



EISA bus. Under the right circumstances, the EISA bus can transfer data between peripheral cards and system memory at 33M per second. EISA systems can also configure their boards from software, which is far more convenient, flexible and fool-proof than changing DIP switches and straps on the peripheral boards themselves, as is necessary with old AT-style boards.

You can plug in either new EISA boards or old AT boards thanks to a connector that lets AT boards enter halfway and EISA boards all the way. The extra EISA pins are in the bottom half of the connector, inaccessible to AT boards which stick on special keys at the halfway point.

The EISA standard provides a path to future expansion and performance increases without turning its back on the past, and represents a worthwhile attempt to avoid some of the obsolescence that plagues the computer industry.

With a part of the 486's technology explained, we'll move on to the reviews proper.

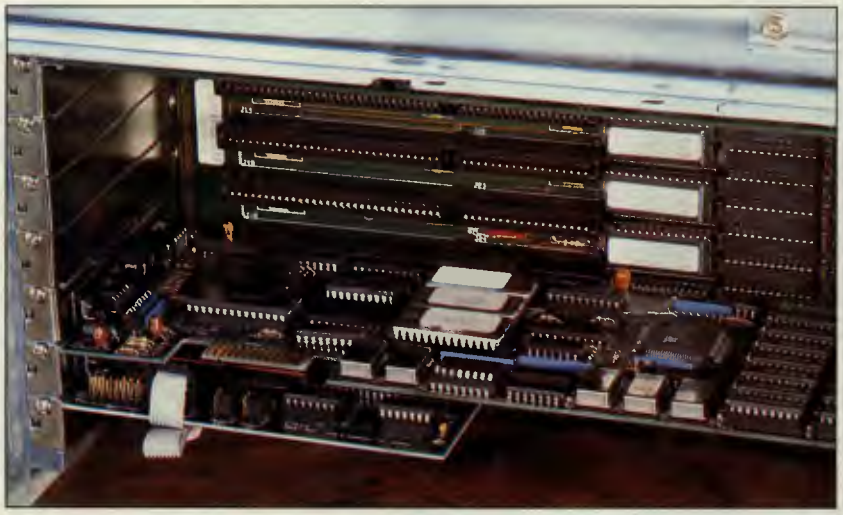
ASI 486

This machine is basically a 486 in 386's clothing. The case is a standard desktop PC case, suitable for ATs, 386s or 486s. The board is a 386 board, with a few slight modifications, and a small add-on board containing the 486, which plugs into the socket for the 386.

The ASI has not been designed from the ground up as a 486; the motherboard and case do not complement each other. Take, for example, the turbo button on the front. (Have you noticed, by the way, how everything went turbo in the late Eighties? There were turbo chargers, turbo boards, turbo compilers and turbo buttons. One turbo day we'll see the last of these turbo buttons and I for one will be very turbo glad to see them turbo off.)

The turbo button on the ASI 486 is vestigial, like the little tail at the bottom of your spine that gets badly bruised when you learn to ski. It doesn't do anything. You can change the speed of the ASI 486 by using the Ctrl-Alt-Plus and Ctrl-Alt-Minus key combinations. Why you would want to slow it down I don't know. Surely there are no longer any packages that care about the clock speed. If you really want to play Astrotit, a 486 machine is probably the wrong choice.

While the ASI 486 has a low-budget look compared with others we tested, it didn't make any compromises on power and storage: it came with a 318M hard disk. DOS version 4 lets you format big partitions, and the ASI was set up with over 200M on the drive C: partition. This is just the sort of storage space you need



The ASI motherboard has a piggy-back board for the 486 chip

for big multi-user databases and other file server functions, or large quantities of huge CAD files. It might pay to take a little care working out how large your partitions have to be. This machine was somewhat slow to respond to commands like DIR, presumably because it has such a large file allocation table to read through. This may have degraded the disk performance in our tests somewhat, so we emphasise that the disk performance could no doubt be improved by formatting in smaller partitions and adding a few utilities to speed up disk access.

The ASI had no special user manual, but there was an extremely detailed manual for the motherboard — just the thing if you want to know the precise memory map for the CMOS configuration memory. Performance was marginally lower than some others, but the price was correspondingly lower too. The result is a Performance/Price Ratio of 1.01.

There's plenty of room inside for expansion, with five free slots, four of which are 16-bit full-size slots. You can fit up to 8M of memory in the motherboard, in either SIMMS (Single In-line Memory Modules) or DIPs (Dual In-Line Packages). An additional memory board can take up to 16M more, giving you 24M in total. There is a socket for a Weitek coprocessor and an Intel 80387 coprocessor, though I don't know why you would want to put an external 387 coprocessor in when you have one inside the chip. This is no doubt an evolutionary remnant.

Anabelle Bits envisages this machine being a low-cost, high-performance CAD workstation. High performance yes, who could deny it, but low cost? The $17,500 price tag does not equal my understanding of the term low cost, but I may have to adjust my sensibilities. It's all relative, as Albert Einstein was fond of pointing out. It is lower than the cost of most other 486 machines we tested, this is true, but the question with these 486 machines is whether we can get enough power without spending this sort of money.

Technical specifications

ASI 486

Distributor:	Anabelle Bits
Telephone:	(02) 313 6155
Price of review configuration:	$17,500
Price of base unit:	$9790
RAM fitted:	4M
Maximum RAM on motherboard:	24M
Hard disk:	380M ESDI
Floppies:	One 5.25in, 1.2M and one 3.5in, 1.44M
Video standard:	16-bit VGA
Monitor:	NEC Multisync 3-D, 1024 by 768 resolution
Keyboard:	101-key enhanced keyboard
Ports:	Two serial, one parallel
Hardware cache:	64K
Bus type:	AT
Main unit size:	43 by 17 by 44cm
Keyboard size:	46 by 20cm
Operating system:	MS-DOS 4.01
Bundled software:	GW-Basic
Accessories:	None

Benchmarks

ASI 486

CPU	**50.2**
Memory	29.4
Disk	**5.0**
Video	12.9
Performance	**17.6**
APC index	6.8
Performance/Price	**1.01**

Compwell i486 Platform

Compwell is an Australian company with a policy of supplying what the user needs, in contrast to marketing a fixed product range. The idea is that the system you need depends on your preferred operating system, the degree of multi-user and multi-tasking capability you require, and your dependence on input/output facilities, graphics and so on. Compwell offers to create the best system for your application, and will construct systems optimised for Novell, Unix, Xenix, OS/2 or LAN Manager.

The configuration supplied for testing was a low-end, intensive database configuration, running MS-DOS. It was maximised for disk input/output, using a PSI Hyperstore disk controller with 128K of external write-back cache. The result is a machine with very high results in the disk test.

Compwell offers a CAD workstation configuration, with a special graphics controller card for greatly increased graphics performance. Supplied for file server use were add-ons including tape backup systems, chains of disk drives to supply up to 30G of storage, and configurations for minimising loss of data or system down-time.

This is a long way from just going to the shop and asking the salesperson for a computer. The 486s are at the serious end of the computer spectrum, and are going to gnaw further into the barrier between PCs and mainframes. The minicomputer, sandwiched between the two, may end up turning into one or the other. When a

Olivetti CP486 is available

NOW.

The First Computing Platform.
Simple as a PC.
Powerful as a Mini.
Universal as a Standard.

The Computing Platform.

The first Computing Platform is based on a completely new concept, which is destined to have a decisive effect on the evolution of information technology. This will lead in the direction Olivetti has always marked out as its own: freedom of choice for the user.

The Computing Platform can harmonise the power and functionality of a minicomputer with the ease of use and compatibility of a PC, and yet it is as universal as an established standard. Providing all the efficiency and the high performance achievable with today's open system architectures, the Computing Platform is already – and will stay available – for the variety of application that exists or will emerge to meet tomorrow's needs.

Lan Server

Because it uses new, advanced, communications software from Microsoft, the CP486 performs particularly well as a Local Area Network server. Together with the speed of the Intel 486* it offers the compatibility of the new EISA based 32-bit bus.

High-Performance PC

The CP486 is an excellent workstation. Using MS-DOS** or MS OS/2** software, and combining the new 32-bit EISA based bus with Intel's 486 microprocessor, the CP486 is a very powerful personal computer.

Technical Workstation

The Olivetti CP486 is also destined for use as a technical (CAD/CAM) workstation for graphics or mathematical applications.

Application Host

With MS-DOS, MS OS/2 multitasking and UNIX-V+, it can serve a whole community of workstations. The CP486 has the power, the compatibility and configurability to start leading you through the '90s right now, without having to give up any of the choices you've already made. I.T. present, future and past – meeting together for the first time on one and the same platform. The Computing Platform from Olivetti.

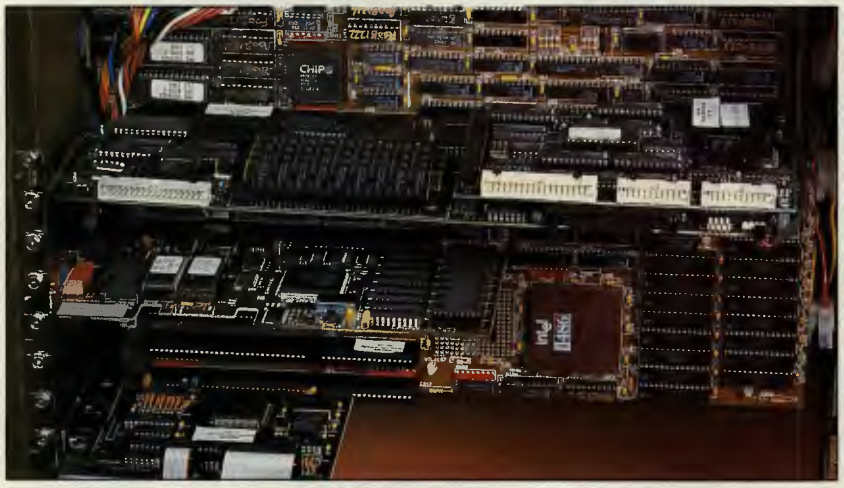
Our force is your energy.

OLIVETTI SYSTEMS & NETWORKS

*486 is a trademark of Intelcorp. **MS-DOS & MS OS/2 are the trademarks of Microsoft Inc. +UNIX is a trademark of AT&T in the USA and other countries.

Contact your local Olivetti Systems & Networks representative now: SYDNEY: Mr Michael Ward, 93 O'Riordan Street Alexandria NSW 2015, (02) 317 2555. CANBERRA: Mr Harold Hird, 214 Northbourne Avenue Braddon ACT 2601, (062) 48 0566. MELBOURNE: Mr Rob Miller, 245-249 St Kilda Road St Kilda VIC 3182, (03) 536 0222 ADELAIDE: Mr Bob Uszynski, 38 Payneham Road Stepney SA 5069, (08) 362 6701. BRISBANE: Mr Derek Scott, 132 Lutwyche Road Windsor QLD 4030, (07) 357 5799 PERTH: Mr David Stewart, Cnr Loftus & Newcastle Streets Leederville WA 6007, (09) 328 3433. HOBART: Ms Jacky Mildred, 147 Bathurst Street Hobart TAS 7000, (002) 31 0922.

Ogilvy OLI9004



A PSI Hyperstore disk controller with 128K of external write-back cache maximises the Compwell's disk input/output

PC is as powerful as the 486, configuration becomes more important, and setting up your system to work best for your application is a key issue. The idea of offering a complete solution rather than a fixed product with options may be a subtle one, but it could mean the difference between a system that works well and one that doesn't.

The test configuration came with an NEC Multisync 3-D monitor and the usual extended keyboard. It was in a dark grey, simple but well constructed tower case. I always like machines that are easy to take apart — with the Compwell, you simply undo two finger screws to reveal an abundance of room inside. Only the Olivetti had more spare slots for expansion. There is a socket for a Weitek 4167 coprocessor, and space for up to 32M of RAM in SIMM modules on the motherboard.

A small but well produced manual contains all the information you are likely to need and not too much extra to confuse you. Its size is an advantage, as there is some chance you can actually bring yourself to read through all of its 50 pages.

As for performance, the resemblance between 25MHz 486 machines continued to hold. The floating point test, Mandelbrot test and graphics test took the same time as all the other machines. The disk went about twice as fast as the others, with its clever caching hardware, so all up the performance was higher and the performance price ratio well above the other machines.

Technical specifications

Compwell i486 Platform

Distributor:	Compwell
Telephone:	(02) 569 3700
Price of review configuration:	$19,832 (professional tower)
Price of base unit:	$16,560 (standard tower)
RAM fitted:	4096K
Maximum RAM on motherboard:	32M
Hard disk:	158/338M
Floppies:	One 5.25in, 1.2M
Video standard:	16-bit VGA
Monitor:	14in Hercules-compatible mono
Keyboard:	101-key extended
Ports:	Two serial, two parallel
Hardware cache:	8K
External disk caching:	128K
Bus type:	AT
Main unit size:	62 by 19 by 43cm (standard tower)
Keyboard size:	48 by 18cm
Bundled software:	DOS 4.01
Accessories:	None

Benchmarks

Compwell i486 Platform

CPU	61.3
Memory	40.2
Disk	11.9
Video	14.4
Performance	25.2
APC index	7.5
Performance/Price	1.27

The Compwell was at the low end of the price range and the high end of the performance range, and that alone earns it honourable mention. The minimum configuration machine was the least expensive of those reviewed, and it seems safe to assume it would have scored lower than the test configuration only in the disk index. This places the Compwell firmly in the best buy category.

Support is an important factor when buying a computer, as we never fail to stress. Compwell offers a two-year warranty, and service contracts throughout Australia. If your machine is in the business area of your city, you can opt for a two-hour response contract. When your machine has a hundred terminals hanging off it, a two hour response could make a lot of difference to a lot of people.

CST Elite 486

The CST Elite 486 is the cheapest 486 machine tested, at a mere $14,200 for a fully configured unit. Included in this incredibly low price is a 42M hard disk, 8M of memory, a 64K external cache, two floppy drives, two serial ports, a parallel port and, wait for it, a games port. It's not really cheap enough to justify buying it to run Space Invaders, but you might find a use for a games port.

Still too expensive? There is a lower cost, higher risk option. CST offers the motherboard alone, with 8M of RAM and 64K cache memory for a mere $9430. Are you a reckless, devil-may-care speed freak who wants to go fast now? Try assembling a 486 machine using your old system and the CST motherboard, and all the very best of luck to you.

The CST Elite 486 comes in a tower case that still has a 386 sticker and a vestigial do-nothing turbo button on it. Accessing the internals can be difficult. Take off the clip-on plastic back cover plate, undo the rather stiff screws connecting the cover to the frame, then hinge the cover up and back from where it fits under the front cover plate. Reassembly is the reverse.

Inside is a big motherboard with room

"As a quality machine, deliberately priced to fit the lower to middle price range, the compact and strongly constructed Triumph-Adler 286 AT would be hard to beat."

Max Pinner, The Australian 23rd January 1990

"After running the Core Disk Performance Program, I received this report". . ."This is the ultimate in hard disk performance. It exceeds all IBM specifications by more than 30% . . ."

Jon Doust, Pacific Computer Weekly 2nd March 1990

The TA Dario 286 is serviced and supported nationwide by the original manufacturer, a company with over 100 years experience in manufacturing office machines.

"...it is in the speed and power stakes that the Dario really shines."
Jon Doust

$2950.00
(RRP inc. tax)

12 MHZ Intel 80286 processor. 20 Mb voice coil (27ms) Hard Disk.
1 Mb Ram. Disk Cache and Ems. VGA Monochrome Monitor.

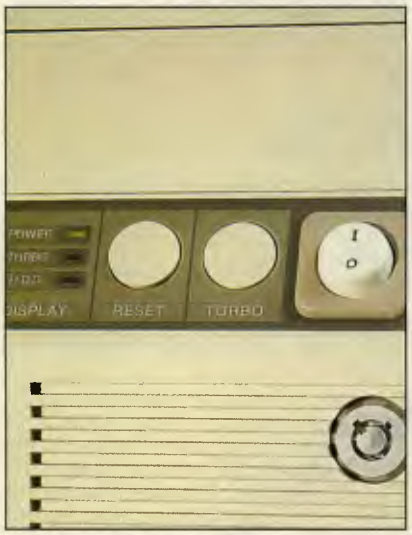
Plus $1480.00 worth of free software.

Ashton Tate's Framework III integrated word processor/spread sheet & graphics/data base/communications.
Custom user Menu MS/DOS 3.3 printing press, cheque book & 5 games. All free.

Options: 40 Mb hard disk add $200.00,colour VGA Monitor add $400.00.

TA TRIUMPH-ADLER
GERMAN FOR EXCELLENCE

Melbourne Elizabeth Solutions, Carnegie 563 5765 • Regal Business Equipment, Richmond 329 1511 • Absolute Solutions, East Hawthorn 882 7351 • Fairbairn Office Equipment, Sth Croydon 723 3396 • Digital Supply, St Kilda 525 4999 • Kev's Computer Shop, Coburg 354 9871 • Kev's Computer Shop, Prahran 513 385 • Computology Aust Pty Ltd, Hawthorn 813 1711 • Ballarat Office Systems & Service, Ballarat 053 314 311 • Chris Humphrey Office Systems, Traralgon 051 747 166 • Daro Twin City Pty Ltd, Albury 060 215 866 • Daro Business Machines, Wangaratta 057 219 277 • Ryrie Office Machines, Geelong West 052 93 322 • The Office People, Horsham 053 825 331 • Peats Office Equipment, Echuca • KB Office Equipment, Middrie • Absolute Electronics, Melbourne 03 663 2411 • Metro Computer Solutions, Essendon 03 379 8544 • Multitech Computers, Tullamarine 03 338 3911 **NSW** Adams Business Equipment, Maitland 049 331 288 • Telstar Data Networks, Woodpark 681 5855 • Harvey Norman Discounts, Wiley Park 740 6055 • Harvey Norman Discounts, Auburn 647 2611 • Harvey Norman Discounts, Penrith 047 321 566 • Harvey Norman Discounts, Warrawong 042 75 2722 • The Computer Centre, Wyong 043 51 2351 • Harvey Norman Discounts, The Kingsway 526 1333 • Harvey Norman Discounts, Fairfield 727 8777 • Harvey Norman Discounts, Gordon 498 1499 • Abbey Technical, Dee Why 982 6730 • Executive Office Equipment, Coffs Harbour 066 524 500 • Technical Office Machines, Dubbo 068 823 833 • Tech World, Werri Beach 042 342 068 **South Australia** Business Equipment Specialists, Darwin 47 2120 • The Office Shop, Victor Harbour 52 2177 • The Office Shop, Barossa Valley 62 1200 • The Office Shop, Port Lincoln 82 5802 • Qikdraw Systems, Adelaide 231 1888 • Nationwide Business Services, Whyalla 45 0005 • Offsys, Broken Hill 2368 • Computers 4 All, Alice Springs 53 0666 • Penasco, Dulwich 364 1388 **ACT** Computer One, Braddon 062 57 6187 • The Logical Approach, Belconnen 06 251 6511 **Queensland** Ag Data Rural Management, Toowoomba 076 328 488 • Positive Business Solutions, Bowen Hills 07 252 5661 • Power Computers, Mackay 079 514 599 • All Computers, Rockhampton 079 222 700 • Excel Systems, Ferny Hills 07 351 2503 • Gladstone Computing Services, Gladstone 079 726 024 • Lowes Music Centre, Toowoomba 076 323 444 • Isaco Office Equipment, Mt Isa 077 432 761 • Adler Cairns Business Machines, Cairns 070 512 774 **TAS** Hopwood Business Equipment, Launceston 003 31 9844 • Hopwood Business Equipment, Devonport 004 24 4822 • Classic Computers, Moonah 002 28 6250 • Businessworld, Hobart 002 34 7666



The CST Elite's tower case still has a 386 sticker and a good-for-nothing turbo switch on it

for five more 16-bit AT cards. There is nothing special about the case, and if the shielding supplied with other machines is necessary, then the shielding on the CST is less than adequate. You can't see those electromagnetic waves, but they must be there. I wear only fully earthed silver mesh underwear, but some people muddle along in their Bonds and BVDs and seem none the worse for it. Wait and see is my policy. If the television goes all wavy when you turn on your CST Elite, perhaps you should turn one or the other off.

There is no Weitek coprocessor socket, so you have to make do with the on-chip coprocessor. This poses no problems, however the maximum memory on the motherboard is limited to 16M. This could prove to be an inconvenience if you want a multi-user multi-tasking system; you can use memory expansion cards, but they slow down performance considerably. You may have to consider another sort of machine if you really want a big, powerful file server. This would make a great extra fast graphics workstation for a single user, though.

The tests indicated that the CST has a slick video card, a crisp, piquant little memory, a hard disk that fails to quite fulfill its early promise, and exactly the same CPU as all the other machines. The tests that can be run entirely from the on-chip cache memory came out exactly the same.

Documentation was appalling, consisting of a stapled wad of sheets full of specifications and technical tables, the little manuals in funny English that came with the VGA and I/O cards and an exploded diagram of a desktop case that had nothing to do with the tower configuration test machine. Nice diagram, though, and handy if your desktop computer explodes.

Support sounds good, with a five-year return-to-base warranty on CST manufactured cards, and a one-year NCR on-site nationwide warranty. However, if support has anything in common with documentation then you could be waiting a while.

The CST, like many low-end machines, occupies its place in the market by virtue of its price alone. It has no special features to recommend it, other than being a lot cheaper than the machines which are basing their appeal on features like engineering, configurability and expandability. Because of their narrow appeal, machines like the CST are the first victims of obsolescence. If for some reason, you need an extremely fast 486 machine now, then the CST is a good buy. If your needs change or the technology changes, it may not seem like such a great idea in a year's time.

Technical specifications

CST Elite 486

Distributor:	CST Computers (Aust)
Telephone:	(02) 748 3711
Price of review configuration:	$13,450
Price of base unit:	As per review configuration
RAM fitted:	8M
Maximum RAM on motherboard:	16M
Hard disk:	42M
Floppies:	One 5.25in, 1.2M and one 3.5in, 1.44M
Video standard:	16-bit VGA
Monitor:	VGA
Keyboard:	101-key European keyboard
Ports:	Two serial, one parallel, one games
Hardware cache:	64K
Bus type:	AT
Main unit size:	62 by 18 by 42.6cm
Keyboard size:	40 by 17.4cm
Operating system:	MS-DOS 4.01
Bundled software:	MS-DOS, GW-Basic
Accessories:	None

Benchmarks

CST Elite 486

CPU	50.2
Memory	31.7
Disk	4.4
Video	15.9
Performance	18.3
APC index	8.0
Performance/Price	1.36

Dolch 486

Dolch Computer Systems is an American company, started by a German technical instrument manufacturer called Volker Dolch. The European parent company, Dolch Logic Instruments, is a major supplier of logic analysers.

The Dolch is a 486 portable, not a laptop. It would be almost indecent to have a laptop with this sort of power; after all, there are people out there who can just barely run their word processors.

The Dolch comes in a graphite grey case about the size of a slide projector. There is an optional separate battery pack, which lets you run it for about an hour away from power outlets, but it isn't the sort of machine you can easily flaunt on the train or the bus.

The engineering is very clean and neat, although a little functional for those who want their computers to look like a Ferrari. Don't laugh, this computer has plenty in common with a Ferrari — expensive, a lot more power than you are likely to need for routine driving and, at first glance, aimed at the status conscious. I can't quite see it replacing all the functions of a sleek road machine — there's no pillion seat.

The manual cover supports the Ferrari theory, boasting a ghostly red sports car that hovers in the firmament above the Dolch. My first impression was that this machine is aimed at the executive on the move who has access to power outlets. You can do your spreadsheets poolside.

However, I phoned Guardian Data, the Dolch distributors in Sydney, and was assured that the Dolch is a serious machine, aimed not at the executive who has everything but at those who need massive processing power in a portable form. It is certainly serious from that point

Australian
Very Personal Computer

NEWS FLASH!

BORLAND APPOINTS MICROWAY AS STATE DISTRIBUTOR

Borland International Incorporated, one of the world leaders in the field of micro computer software development, have added an additional push to their world marketing activity with the establishment of Borland Pacific and its appointment of MicroWay as the Victorian State distributor. The union of MicroWay and Borland Pacific promises to bring greater market penetration and increased customer acceptance of Borland's high performance product range.

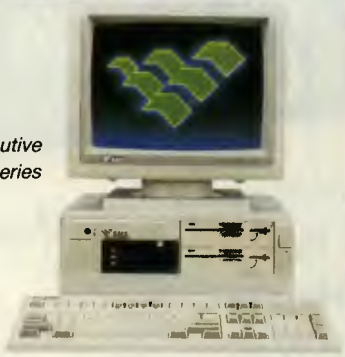
- **Providing a greater dealer network**
- **Superior product range**
- **Greater service and support**
  - Quattro Pro
  - Turbo C
  - Paradox
  - Turbo Pascal

TO LEARN MORE ABOUT THE EXCITING BORLAND RANGE CONTACT MICROWAY.

MICROWAY
SOFTWARE

292 Chesterville Road, Moorabbin, Vic., 3189
Telephone: (03) 555 4544 Fax (03) 555 9871
BBS: (03) 555 4932 P.O. Box 219 Moorabbin

SUN MOON STAR



Executive Series

Sun Moon Star Australia, backed by its 45 year old international parent, promises to deliver service into the Australian Personal Computer and Telecommunication Industry. We believe our high level of commitment to quality of product and service will add a new dimension for the Australian consumer.

The Executive Series computer features the latest "ASIC" space age technology. Built around the 386SX CPU this model gives a good balance of 386 power and reliability with excellent price performance, making it the ideal choice for the business and professional user. Our confidence in this product is backed by our World-Class quality, *3 year warranty* and no hassles first year on-site service contract.

Sun Moon Star
Australia Pty. Ltd.

Unit 3, Harcourt Estate, 809-821 Botany Road, Rosebery, N.S.W. 2018

Sydney (02) 317 3311 Melbourne (03) 663 8161

Dealer Enquiries Welcome

The benchmarks: what they revealed

There was an eerie similarity in the performance of the machines tested. The first we looked at was the ASI, a tribute to the speed and efficiency of the people at Anabelle Bits. We ran our standard tests, and created a few more that tested floating point and graphics capabilities. The ASI 486, and the machines tested thereafter, completed these tests an order of magnitude faster than their 386 counterparts.

A test that calculates and draws a 3-D contour grid in VGA colour takes less than three seconds to run on a 486; just under 30 seconds on our 16MHz 386; and just under 40 seconds on our 10MHz AT. On the 4.77MHz XT, the geriatric benchmark standard, it takes three and three quarter minutes.

Our exclusive floating point test was the clincher. To perform 50,000 floating point calculations, the 486s took about five and a half seconds. This is 45 times faster than the 386, and 65 times faster than the AT. It runs just under 400 times faster than the XT. That on-chip coprocessor can really crunch numbers.

Ever fashionable, we also ran a test that graphs a region of the Mandelbrot set on every machine. This takes 56 seconds on a 486 machine; on our 16MHz 386, without a coprocessor, the test took around 20 minutes.

When the same tests were run on the other 486 machines, the results were similar. In some cases, to our confusion and bewilderment, they were identical! The floating point test and the graphics test on the ASI, the Dolch and the Olivetti gave the same result to within one hundredth of a second. The Mandelbrot set test, which was timed with a stopwatch, gave the same result to the second.

It seems that the 486 is so self-sufficient that these tests can be performed without too much reference to the rest of the system. It's a real computer-on-a-chip, with memory, bus, coprocessor and CPU all tucked in together.

The Dolch claims to run at 11 million instructions per second (mips). Our 16MHz 386 that we were so proud of last year runs at 3.1 mips. Where will it all end?

of view. The Dolch has just as much power as the other 486 machines tested — once again some measurements agreed to the hundredth of a second.

The Dolch design has some very pleasing features. The keyboard forms most of one side of the case, and unclips to reveal the gas plasma monochrome VGA scale. You can run a VGA monitor concurrently with the gas plasma display, but this is unnecessary unless you need to distinguish colours. The grey-scaled gas plasma display is very crisp and legible, combining the clarity of monochrome with much of the variety of colour.

The keyboard has a good, firm feel, with well moulded keys. It's not quite the standard keyboard, but it's very close to the 101-extended keyboard with the function keys on top. It doesn't have the separate cursor control key pad, and the control key is in a funny position, so that you keep on hitting the Alt key instead.

Like Dr Who's Tardis, it's quite roomy inside, with space for three full-sized cards, one 8-bit and two 16-bit, in addition to the VGA card and parallel/serial driver controller card provided in this configuration. You can have one 5.25in or one 3.5in floppy drive, to go with the

GRAPHICS!

Add lightning fast graphics to your programs quickly and easily through the popular PCX file format. Why reinvent the wheel? Make your programs immediately compatible with hundreds of packages from Aldus PageMaker to ZSoft's PC Paintbrush with these linkable graphic libraries.

"An exceptional product" - Programmer's Journal, Aug '89 $395

Version 3.5 of the PCX Programmer's Toolkit gives you over 60 powerful functions to manipulate bitmapped graphics. Use Virtual screens, Super VGA modes, LIM 4.0 support, a 300 page manual, 9 utilities including screen capture and display, and the fastest routines on the market.

Need Special Effects, but caught in a GRASP? $199

Why create a demo when you can create the real thing? Don't be trapped in a slideshow editor or demo program when you can use **PCX Effects** for the PCX Toolkit and your favorite programming language. A Music Language and spectacular effects for exploding your graphics!

Blazing Graphics Text $249

With **PCX Text** you can display text with graphics as fast as it always should have been. Display characters, strings, fixed and proportional text, background transparency, and more. Includes a font editor, 85 fonts, and text utilities for blazing graphics bitmapped text.

NO ROYALTIES!
30-DAY MONEY-BACK GUARANTEE!
SOURCE CODE AVAILABLE!

All packages support 12 compilers for C, Pascal, Basic, Fortran, Assembly, and Clipper. All modes of the Hercules, CGA, EGA, VGA, and Super VGA adapters are supported, up through 800x600x256 (22 modes in all). Assembly Language source code is optionally available. Trademarks are property of their respective holders.

For orders and information, call:

G·E·N·U·S MICROPROGRAMMING
11315 Meadow Lake • Houston, Texas 77077 • (713) 870-0737
FAX: 713-870-0288

Technical Imports
Suite 602, 6th Floor
220 Pacific Highway
Crows Nest, NSW 2065
2-922-6833
2-925-0311 (Fax)

Questwill Enterprises
"Questwill"
Crooked Lane
N. Richmond, NSW 2754
45-711-054
45-711-314 (Fax)

A machine for those needing voluminous processing power in a portable form: the Dolch 486 Portable

100M voice coil hard disk drive. This is the key to the usefulness of the Dolch. Unlike most portables, it has room for analogue/digital cards, fax cards, or other add-ons, and plenty of storage space. There is an optional additional expansion chassis which provides three more full-sized 16-bit slots, plus an additional 200W power supply.

Memory is installed on a memory board that fits into a special slot in the motherboard. You can have a 5M board or a 16M board. There is a socket for a Weitek coprocessor, if you're not satisfied with the floating point performance (but perhaps you would prefer a Cray supercomputer in this case?)

The manual is very thorough, and moves right from introductory material for beginners to full card specifications and technical data. It's pretty much a compilation of card manuals and MS-DOS introductory material, and it tends to err on the side of technicality, as might be expected of a technical instrument manufacturer turned computer manufacturer. There are a couple of pages describing 'electroluminescent' display technology (not relevant, as it happens, to this configuration), and electroluminescent is the least technical word in the book. The manual comes in a three-ring binder. It's not a high gloss fashion mag finish, and it isn't quite up to date, with diagrams for the Dolch 386, but no doubt it is a prototype manual and the Vogue-style version is on its way.

The Dolch has a lot going for it: a portable with power equal to the most powerful office machines, and yet it costs a mere $22,870! What sort of sports car can you get for that these days?

Technical specifications

Dolch Portable 486

Distributor:	Guardian Data
Telephone:	(02) 406 6144
Price of review configuration:	$22,870
Price of base unit:	As per review configuration
RAM fitted:	2M
Maximum RAM on motherboard:	16M
Hard disk:	84M (up to 670M available)
Floppies:	One 5.25in
Video standard:	Gas plasma, 16-bit VGA
Monitor:	VGA
Keyboard:	101-key keyboard
Ports:	One serial, one parallel
Hardware cache:	64K
Bus type:	AT
Main unit size:	41 by 20 by 24cm
Keyboard size:	41 by 24cm
Operating system:	MS-DOS 4.01
Bundled software:	None
Accessories:	Carrying case

Benchmarks

Dolch Portable 486

CPU	50.2
Memory	26.6
Disk	4.9
Video	11.8
Performance	16.7
APC index	5.2
Performance/Price	0.73

Hewlett-Packard Vectra 486

The HP Vectra is an EISA system, as is the Olivetti. It was the only machine with Unix installed, and is apparently intended as a Unix file server. In addition to the usual serial/parallel and graphics boards, there was a terminal multiplexer board to be used in conjunction with independent terminal concentrators to attach up to 32 terminals. The terminal mux and four terminal concentrators are not included in the price quoted for the system below, however.

The Vectra comes in a tall case, with an anonymous, stony-faced sort of front panel. There is very little you can press or see. You can turn the power on and off, and there are power and disk access LEDs, but it's a long way from the disco mirror ball flashing lights approach adopted by

Benchmarks

Hewlett Packard Vectra 486

CPU	50.2
Memory	25.4
Disk	5.2
Video	12.0
Performance	16.8
APC index	2.1
Performance/Price	0.57

"FOR INDEPENDENT ADVICE ON AUSTRALIA'S BEST VALUE PC'S MONITORS, PRINTERS & SOFTWARE"

CAPITAL COMPUTER EQUIPMENT

CALL: (03) 525 2622
TOLL FREE: 008 335833
FAX: (03) 525 2940

NEC MultiSync 3D

- 14" Screen
- 0.28 Dot Pitch
- 1024 x 768 res.
- Analog & TTL

"The Industry Standard"

Only $975

BRISTOL — Blinding Speed 59.2 Mhz LANDMARK

- 386/33 System with Disk Caching
- 32 bit bus (8 I/O Slots)
- 4 Mb RAM (80 nS) up to 16Mb
- 80386/33 Processor
- 33Mhz Zero Wait State
- 105Mb ESDI Voicecoil H.D.D.
- 4Mb RAM (80 nS) up to 16Mb
- Super VGA, 16 Bit Card (1024 x 768 res.) 512Kb DRAM
- 64Kb cache; thoroughly reliable
- 1.2 Mb 5/25" F.D.D.
- Super VGA 14" Colour Monitor (1024 x 786 res.)
- DOS 4.01 and GW Basic

18 Month Warranty

Only $9,990 SAVE $5,900

WORLDS FIRST

RENARD
Your business cunning

BATTERY POWERED 20Mhz 386 LAPTOP

- ★ 40Mb Voicecoil H.D.D.
- ★ Battery/mains power
- ★ 20Mhz 80386 CPU
- ★ 2Mb of RAM (up to 8Mb)
- ★ 3.5" 1.44Mb F.D.D.
- ★ VGA Card (640 x 480 res)
- ★ Detachable keyboard
- ★ External 5.25" 1.2Mb F.D.D. optional

$7490 120Mb $8290

CALL for full Renard range

BRISTOL — SUPERFAST!

43.5 Mhz Landmark 386/25 system

- 43.5Mhz Landmark (25Mhz Zero Wait State)
- 150Mb ESDI Voicecoil H.D.D.
- 1.2Mb 5.25" F.D.D.
- 4 Mb RAM (80 nS) to 16Mb
- Super VGA, 16 Bit Card (1024 x 786 res.) 512Kb DRAM
- 64Kb cache, expandable to 256Kb
- Super VGA 14" Colour Monitor (1024 x 786res.)
- DOS 4.01 and GW Basic

18 Month Warranty

$7990 SAVE $2300

Australia's Best Value 386/25 — ARROW

PERFECT FOR CAD, DTP OR AS A LOW COST SERVER!!

- 80386/25 Processor
- 4Mb RAM (80 nS)
- 25Mhz Zero Wait State
- 64Mb Voicecoil H.D.D.
- Super VGA Card, 16 Bit (1024 x 786 res.) 512Kb DRAM
- 14" Colour Monitor (1024 x 786 res.)
- DOS 4.01 & GW Basic
- Unix, Xenix, Dos, Novell, OS2, Pick, Compatible.
- 12 Month Warranty

ALL THIS PLUS MORE!!

$4990 SAVE $1400

CHENDAI — YOUR BUSINESS CUNNING

CHENDAI LAP Ip (20)

- ★ 20Mb Hard Drive
- ★ 5.25" or 3.5" Floppy Drive
- ★ 10Mhz, 8088 CPU
- ★ Carry Bag & Software

GREAT VALUE

$1690 TAX INC.

AUTUMN SPECIALS!!

Xtree Pro Gold	$165
dBase IV	$825
Laplink III	$190
WordPerfect V 5.1	$535
Microsoft Works	$210
Lotus 123	$call
20Mb Hard Drive	$350
40 Mb NEC H/D, 28 mS	$599
80 Mb Hard Card, 19 mS	$1495
Microsoft Mouse, Serial/Bus	$200
Trackman, Mouse without Motion	$195
H.P. Laserjet III	$call
Epson LX 400	$345
132 Column, 9 Pin Printer	$490
Dual Floppy Portables	$990

Super VGA Monitors!

- 14" Screen
- 0.31 Dot Pitch
- 1024 x 768 resolution
- 12 Months Warranty

Superb Value

Only $690

Only $2990

ELITE 386/SX

Why buy a 286 for business?

- 80386/SX 16Mhz O.W.S.
- 1Mb RAM
- 1.2Mb Floppy Disk Drive
- 40Mb Hard Drive (23 mS)
- VGA Card
- VGA Monitor (1024 x 768 res.)
- All I/O Ports

PLUS MORE!!!

GVMNT. CALL FOR PE 40 PRICES

CORPORATES: FAX OUR "QUICK-QUOTE" SERVICE FOR ALL YOUR PC REQUIREMENTS

BULLETIN BOARD

WORLD'S FASTEST VGA BOARD!
THE NEW ATI VGA WONDER-BOARD

- High Speed. Perfect for 286 & 386
- 132 Column Text Available
- 100% Register Compatible in ALL MODES! VGA, EGA, CGA MDA, Hercules and 8514/A
- 256Kb and 512Kb Versions

PLUS MORE!!

FROM $590 TAX INC.

MasterCard VISA

MAJOR CARDS WELCOME

CAPITAL COMPUTER EQUIPMENT

618 St. KILDA RD., MELBOURNE 3004

PLENTY OF PARKING

CALL: (03) 525 2622
TOLL FREE: 008 335833
FAX: (03) 525 2940

GRASP THE FUTURE

The road ahead is 32-bits wide, and Twinhead has the map

Superlap-386SX

A portable handful of power and performance. Features 386SX, RAM up to 4MB, FDD and HDD, VGA graphics with 32 greys, 640×480 page-white LCD, 83-key detachable keyboard with embedded keypad. Ports include 2 serial, 1 parallel, external monitor/disk drive/keyboard/keypad, expansion bus, and interface for an internal modem. Using AC power or NiCad battery, Superlap gives you 32-bit power on the move.

Superset-600

A compact platform for fast 386 or 486 processing. The basic 600 (386-25MHz) is slotted for simple Power Card upgrades. Power Cards supply CPU (386-25 /33, 486-25/33), 64KB cache, and cache controller. All-in-One design integrates VGA, parallel and 2 serial ports, and drive controllers on mainboard. Storage for 2 × FDDs, 3.5″ HDD, and 5.25″ Tape/HDD. Superset-600 is your bridge to the future.

Staying abreast of everchanging technology is critical. Twinhead has an unparalleled record of engineering the latest ideas into reliable, affordable systems. Take the future in hand, see Twinhead's new 32-bit models. Your systems for the nineties.

Twinhead

Engineering Ingenuity

Global Industrial Center
2nd Floor, 2 Lane 235,
Bao Chiao Road,
Hsin Tien, Taiwan, R.O.C.
Tel. (886-2) 917-9036, Fax. (886-2) 917-2674/5

Trademark Recognition:
Intel Corp.: 80386, 80486, 80386SX
International Business Machines Corp.: VGA
Twinhead International Corp.: Superlap, Superset-600

Inside the tower you'll find HP's usual careful shielding

other, less austere machines. Opening the tower reveals the beautiful engineering, with the usual HP careful shielding and robust design. The 486 chip lives alone inside a little metal cage, on a separate, sparse board beside the memory board. It is a very powerful chip, and perhaps the HP engineers fear it may escape and savage the other ICs. The memory board and the CPU board attach to the back plane by some kind of super-duper connector with about 360 pins on it, so I think you can regard them as effectively all part of the motherboard. You can fit 64M of system memory into the memory board using SIMMS.

I typed DOS at the starting prompt to get into DOS and perform my tests. I ended up in a rather disappointing menu system, with some very poor choices of colour (blue text on red background), and promptly bailed out of it into DOS proper.

The HP Vectra was on par with the other machines in the floating point, graphics and Mandelbrot tests. It performed a little less well in the memory, disk and video tests, and came up with a lower performance rating. When I say a lower performance rating, I mean it still went faster than the fastest 33MHz 386 machines around, but it went marginally slower than the other 486s.

The Vectra comes with a wonderful manual, and plenty of additional documentation. A little brochure entitled *HP Vectra Support and Services Information* won the Multicultural Prize for Most Languages Translated Into (eleven languages including Afrikaans and Suomi). Speaking of support, there is a one-year warranty.

A nifty set-up facility that realises the great potential of the EISA bus makes system set up easy. It is called Easy Config, and it takes you into an aqua, white and blue world of menus and windows that lead you gently through the myriad of configuration options available. Other software supplied with the machine include mouse software and multiplexer software if you choose that option.

The mouse and keyboard both plug into DIN connectors in the special keyboard, mouse and serial port board. No more using up a serial connector for the mouse. The Hewlett-Packard mouse is among the most sensual little rodents I have ever fondled. Ergonomic is a word totally inadequate to describe its smooth, voluptuous contours. With the cage for the 486, and the organically curved mouse, there appears to be an element of biological design creeping into the HP engineering vocabulary. Keep it up, I say.

Technical specifications

Hewlett-Packard Vectra 486

Distributor:	Hewlett-Packard Australia
Telephone:	(03) 895 2895
Price of review configuration:	$29,623
Price of base unit:	$18,738 (no hard disk)
RAM fitted:	4M
Maximum RAM on motherboard:	64M
Hard disk:	330M
Floppy disk:	5.25in 1.2M
Monitor:	VGA
Keyboard:	101-key keyboard
Ports:	Two serial, one parallel
Hardware cache:	8K (internal 486)
Bus type:	EISA
Main unit size:	60 by 21 by 50cm
Keyboard size:	46.8 by 19.8cm
Operating system:	MS-DOS 4.01
Bundled software:	Microsoft Windows/386
Accessories:	None

WHAT MAKES AMI COMPUTERS THE VERY BEST - PART 12

AMI American Megarends Inc Motherboards

...the world's fastest 386/25 based motherboard, a staggering nine times faster than the original IBM AT.

PCW, 1989

...the AMI features this chip (Intel 80386/33) on its motherboard ... the fastest computer we have ever tested.

Info World 1989

Authorised Distributors

Computer Designed Publishing
Birkenhead Point
Specialising in Desktop Publishing
Hand & Flatbed Scanners
Software Training
Ph (02) 719 8080 Fax (02) 719 8008
Network & Data Hurstville
Specialising in CRA Terminals
Wordprocessing,
General Office Computing
Ph (02) 570 9711 Fax (02) 580 8144

CHOOSE FROM 20,000 OF THE WORLD'S BEST DOS SOFTWARE

ONLY $10 A DISK

AV. 100 NEW DISKS MONTHLY

The strength of SME Public Domain's Australian and New Zealand membership enables us to provide all the latest releases and upgrades at less than half the cost of anyone else.

With an average of 100 new disks coming in monthly from around the world we have programs for just about everything, all clearly catalogued into 26 easy-to-find categories.

Cost is $10 per disk, including postage and handling, or $5 a disk for SME Public Domain members ($6 mail order) - Only $45 to join.

3.5" format - $10 per disk for members, $15 for non-members.

Current Top 50 Disks

Ring, write or fax today for your FREE shortform catalogue, or fill out the coupon below to join.

MAC PROGRAMS

Over 700 disks of the world's best Mac I & II software $20 annual membership gets you our 300 page catalogue and quartely updates of new releases.

All disks only $12 a disk ($13 mail order).

SME

PUBLIC DOMAIN

SINCE 1978

HEAD OFFICE

22 Queen Street, Mitcham, Vic. 3132

Tel: (03) 874 3666 Fax: (03) 873 4086.

SYDNEY BRANCH

3 Russell Street, Granville, 2142

(200 metres from station)

Tel: (02) 897 1566

TOP 50 DISKS

A339 Vet6.25, Scan60, Scanres74, Sentry Virus Protection, Dectection & Removal for boot sector viruses.

S1377 - Speech V1.00 Make your computer talk! Speech can be programmed to say most anything.

A367 - 4DOS MS-Dos Processor V2.0 A versitile DOS shell that adds over 30 new commands to your command line.

A047 - Ford Racing Game Great graphics in this racing game, plus a 1988 FORD buyers guide.

A040 - SME's Utility Disk Some of the better technical and general purpose utilities.

A338 - Miscellaneous Utilities A useful collection of technical utilities.

A099 - Adventures of Capitain Comic V3.00 This great adventure supports EGA/VGA graphics.

S1496 - Charts Unlimited V1.8 Creates flowcharts, floorplans, electical diagrams, and more.

S1412 - Learn To Guess Four challenging educational games for children in grades 1 to 12.

S078, S627, S1235 - PC-Write (3 Disk Set) V3.03 A powerful and easy to use word processor, with a spell checker - and it's own pagination and print utility.

S1393 - Diskette Manager V2.1 A useful disk cataloging program.

S1495 - Alice In Wonderland An adventure game based on the book. Suitable for ages 9 years and up.

S646 - Amy's First Primer V1.5 Six games to teach basic skills to the pre-reading child.

A397 - Family Tree V41.0 Create your own family tree using this simple menu driven software.

S1236, S1237, S1238 - PC-File (3 Disk Set) V5.0 An upgraded version of PC-FILE:dB. This program includes a data base and graphics capabilites for graphs, and is entirely menu driven.

S1220 - Dracula In London V1.03 An adventure game with exellent graphics for 1 to 6 players.

S1119 - Flushot+ V1.6, Hd-Sentry V1.60 Virus and Trojan horse protection programs for your Hard disk & system.

S1406 - Sierra GamesUnprotect V2.00 Removes copy protect from most Sierra on-line games.

S1419 - Maze Cube V1.01 A puzzle strategy game for all ages.

S727 - Powermenu V4.50 An easy to use menu driven operating enviroment for your PC.

S1338,S1339 - Wordperfect Learning System (2 Disk Set) A training tutoral for Wordperfect 5.0

S1287, S1288 - Zoomracks (2 Disk Set) An information management system with mouse support.

S1289 - Zoomracks Small Business A business starter kit for Zoomracks.

S1290 - Zoomracks - Home Starter Kit A home starter kit for Zoomracks.

S1291 - Zoomracks - Small Business Accounting Enable Zoomracks to act as a complete small buisiness accounting package.

S1334 - Touch Type Tutor From beginner to advanced touch typing course.

S1437 - Dungeon V3.0 An exciting Dungeons and monsters game adventure game for ages 10 up.

A095 - Anti-Virus - Bomb Squad, Chk4bomb Anti-virus programs that checks for, and removes viruses & trojans.

B006 - X-Rated X-Printshop Sign Maker Yes, X-rated software for screen and printer!

A030 - Games - Assorted - No. 2 Assorted games such as 3-D Pac-Man and Kong plus may more.

S1465 - Brandon's Lunchbox Educational programs to develop essential skills in children ages 3-7.

A354 - Clipart & Symbols Pcc Format A collection of .PCC Format clip-art files to add to your publishing progs.

S403 - Tutorial - IBM PC Computer V4.4 A basic course in DOS.

S1245 - Thesaur V3.6 A Computerized Thesaurus.

A395 - Games That All Can Play Speed Typing and assorted games.

S866, S667 - Deep Space (2 Disk Set) V1.30 Plots and identifies stars on a map given latitude and date.

A097 - Assorted Disk Utilities #1 Collection of disk utilities, and a system speed-up program.

S1490 Vegas Pro V1.0 A 5 card draw poker game with excellent graphics.

S456 - Assorted Games V1.0 A collection of great games.

A358 - Graphics Converter V1.00 Converts graphics files to differnt formats, eg. PC paintbrush to PrintMaster

S1337 - C-Personal Compiler V1.2B Fast and compact C compiler for small C programs, less than 64K.

S1394 - Read My Disk! Recovers ASCII files from badly damaged disks.

S279 - Pianoman & Piano Player V4.0 User supported programs for playing,editing and recording music.

S1383, S1384 - PC-Estimator (2 Disk Set) V2.72 Building cost estimator for constuction projects.

S846, S846 - Lotus Learning System (2 Disk Set) V2.3 A learning system for Lotus.

A001 - SME X-Rated Software Catalog V0290 Catalog of SME's X-Rated Software.

S1103 - Silicon Sky View the stars and solar systems as views anywhere in the word at any time.

S1150 - Simply Labels V2.01 Nine different Fonts compliment this Label-Making package.

S1147 - Fast Invoice/ Statement Writer V2.01 Quickly creates invoices and statements, as well as mailing labels.

S1411 - Solitaire Card Game Three terrific Solitaire Card Games.

To SME Public Domain 22 Queen Street, Mitcham, Vic., 3121

☐ Please enrol me as a member of SME Public Domain. I enclose $45

☐ Please send me my MAC Almost-free catalogue. I enclose $20

Surname _____ First name _____

Optional address _____

Town/suburb _____ Postcode _____

Tel No: (__) _____

Payment by cash ☐ B/Card ☐ Visa ☐ M/Card ☐ Cheque ☐

Card No. _____ Expiry Date __/__/__

Signature _____ Recommended by Member No. _____

How did you hear about us? _____

APC/5

Parallel processing: coprocessors and multi-processors

The 486 machines all have an on-chip 80487 coprocessor, which accounts for their extraordinary performance at floating point computations. Floating point coprocessors execute calculations while the main processor is engaged elsewhere, and this kind of parallel processing leads to big speed advantages.

There is, however, no limit to how much computational power people can soak up. If they find a machine that can handle their spreadsheets faster than they can make a cup of coffee, they invent Mandelbrot sets to compute so that their machines seem slower again. And, of course, some people don't drink coffee.

For these people, many 486 machines have sockets to accommodate Wietek coprocessors, which are reported to double or triple your machine's speed in floating point computations.

Some people are never satisfied. The Olivetti provides another type of socket for an Intel 860 64-bit microprocessor. This is a chip designed for parallel processing, pipelining and many other computer buzz words. It has RISC design — the leading edge of another kind of parallel processing, which is likely to be the route for eking ever more performance out of computers in the years to come. It is in its early stages yet, and special software is required, as it is not compatible with MS-DOS Intel 8086 series software.

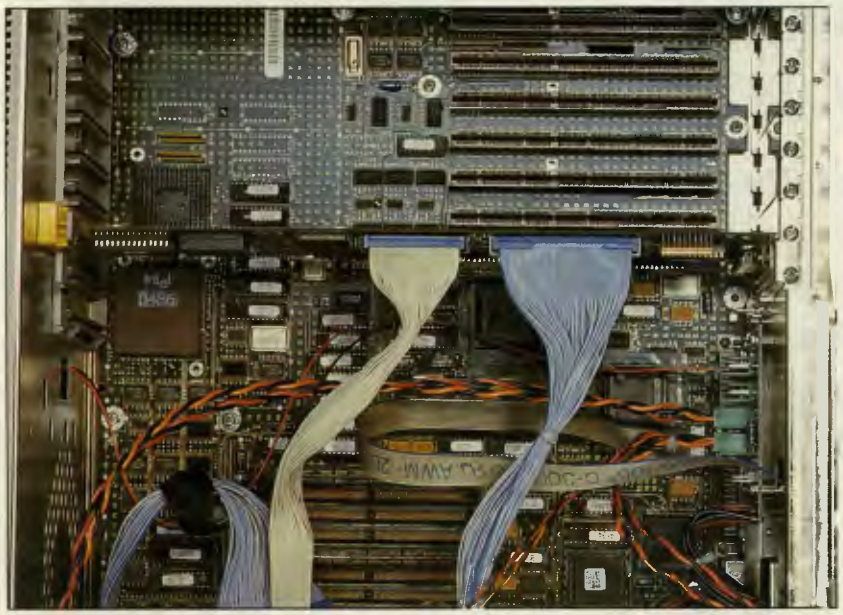
There is very little of this software available, but when you have the software and the 860 chip, the word is that you go very very fast. I was told by Olivetti that an unspecified test went 12 times faster on a combined 486 and 860, than on a 486 alone. True to my image as a hard-hitting investigative journalist, I pressed for details of this test, and finally spoke to Signor Gianotti from the parent company. Have you guessed? The test was drawing the Mandelbrot set, the standard by which all chaos is judged, and probably as good a model for the evolution of computer systems as any I have come across.

Olivetti CP 486

The Olivetti CP 486 is a very nice machine. According to Olivetti representatives, it is the only bug-free 486 machine around. The story is that the 486 chip still has bugs, and Olivetti discovered them in the course of testing and then "interacted" with the chip manufacturer, Intel. Together they were able to arrive at a modification to the motherboard that corrects the bugs, and only the Olivetti CP 486 has these modifications. The CP 486 uses the EISA architecture, so it is less prone to obsolescence than machines using the old AT bus.

The CP 486 has other performance oriented features. For one, there is room for the usual Weitek coprocessor. As I mentioned earlier, there is an additional big socket for the incredible Intel 860 chip, which, if you are prepared to write the software yourself, can really rip.

The CP 486 has a 64-bit memory bus. The standard is 32 bits, and the difference is that the CP 486 can grab two



Olivetti's 486 offering uses the EISA architecture, rather than the old AT bus

WHAT MAKES ASI COMPUTERS THE VERY BEST - PART 93

Adaptec Hard Disk Controllers

Novel Adv,SFT,386 Compatible

Adaptec SCSI controllers bring mainframe I/O features and performance to the micro PC.

And with data transfer rates of up to 10 Mbytes per second, that's 40 times as fast as standard AT hard disk controllers.

For more Information call now

Authorised Distributors

Desktop Presentations, Winston Hills.
Specialising in DTP, Networking, Film Recorders, Computer Presentation Systems
Ph (02) 639 6028 Fax (02) 639 5527

Computer Haven Maroubra
Specialising in Retail Point-of-Sale Systems Office Automation Systems
Ph (02) 349 2366 Fax (02) 349 5501

The Ease of Sophistication

Enhanced 80386SX-based AT® compatible with on-board VGA graphics and more

Sophisticated, yet not complicated. The difference is the 80386SX™ microprocessor, which introduces you to a new level of ease. Moreover, the MPC2386 puts 16-MHz of ready power at your fingertips, which will help you manage an entire gamut of 32-bit software applications. The compact good-looks of the MPC2386 lends support to 5-1/4″ and 3-1/2″ diskette drives; plus, there's VGA graphics, and expandable memory on board. And the price makes it all look even better. The MPC2386 is the kind of sophistication that you've been looking for.

MiTAC

People Committed To InfoTech

■ Mitac International Corp. TEL: 886-2-501-2679 FAX: 886-2-501-4265 AUTHORIZED DISTRIBUTORS IN AUSTRALIA & NEWZEALAND ■ Australia - Keller Automation TEL: (03) 580-1355 FAX: (03) 580-6872 ■ New Zealand - Orchid Trading Co., Ltd. TEL: (09) 2765124 FAX: (09) 2766752 ■ Pacific Islands - Pacific Trading Co., Ltd. TEL: (676) 21-320 FAX: (676) 23-120

Mitac is a registered trademark of Mitac International Corp. AT is a registered trademark of International Business Machines, Inc. 80386SX is a trademark of Intel Corp.

Technical specifications

Olivetti CP 486

Distributor:	Olivetti Systems and Networks Australia
Telephone:	(02) 317 2555
Price of review unit:	$28,084
Price of base configuration:	As per review configuration
RAM fitted:	4M
Maximum RAM on motherboard:	64M
Hard disk:	300M
Floppies:	One 5.25in, 1.2M
Video standard:	EVC Video — enhanced VGA, up to 1024 by 768 pixels
Monitor:	EVG (Enhanced Video Graphics)
Keyboard:	101-key keyboard
Ports:	One serial, one parallel
Hardware cache:	64K
Bus type:	EISA
Main unit size:	62 by 21.2 by 62cm
Keyboard size:	47.5 by 21.1cm
Operating system:	MS-DOS 4.01
Bundled software:	None
Accessories:	None

32-bit words from memory at a time. There is plenty of room for expansion, with six EISA sockets free to accommodate six 16-bit AT type cards, or six EISA cards. Data transfer is much faster using the 32-bit bus, so EISA cards are recommended.

Memory starts at 4M and expands to 64M, using SIMM modules which plug directly into the motherboard. Expansion using 16-bit AT memory boards is frowned upon, as it degrades performance.

The tower case is more than standard. The front panel has lots of lights, with interesting language independent symbols. What's more, the manual even explains what they mean. A small LCD display shows you a little more of what is happening. While the Power On Diagnostics are running, it displays 'P.O.D. Running', reminiscent of HAL and his pod-bay door problems. You can press little function buttons to step through other displays that tell you what kind of configuration the system thinks it has. You can even set the speaker volume to one of seven levels.

This system is designed with networks and multi-user systems in mind, so there is password protection on both the system and the keyboard. A console light lets you know if the system can be accessed over a network.

The case has a flip top to give access to the ports and connectors, which you can then replace without interfering with the cables. The side of the case can be removed by simply undoing a single screw. Inside is lots of room and some very clean engineering. The mounts for the cards are nicely reinforced so that they can't rattle around, and it looks well shielded and sturdily constructed.

The manual is easily one of the best I have seen. It teams with well-drawn diagrams, is well written and superbly produced, and just the right size to give you plenty of information without bringing on eye-glaze and head-swim. And that's not all. There is a full VGA colour all-singing, all-dancing introductory diskette that has to be seen to be actually believed. I especially liked the bit where the funny 3-D solid rotates, changes shape and bounces around in perspective while illuminated by lights you can turn on and off according to taste — but then I'm a pushover for colour and movement.

The Olivetti also has a flash EPROM, so you can actually program the BIOS ROM instead of replacing it when you have to upgrade.

The video is supplied by an EISA EVC video card. This supports an extension to the VGA standard, with a maximum of 1024 by 768 resolution, and presumably 32-bit data transfer via the EISA bus. It's very fast. Supplied with the card are

Benchmarks

Olivetti CP 486

CPU	50.2
Memory	37.8
Disk	6.6
Video	14.1
Performance	20.5
APC index	3.3
Performance/Price	0.73

WHAT MAKES ASI COMPUTERS THE VERY BEST - PART 101

ASI008
Engineering Excellence describes the ASI008.

The ASI008 is a compact, yet full featured 16MHz AT Workstation. With all standard I/O functions built into the ASI008 motherboard, the ASI008 will present the most cost-effective solution to any workstation application.

The ASI008 has onboard VGA and the capacity for 200 Mbyte of internal local hard disk storage, these features make the ASI008 a very powerful Novel Workstation, ideal for Educational classroom use.
For further information call now

Authorised Distributors

Micro Trend Computers Arncliffe
Specialising in PICK MultiUser Soln's
Accounting Software, Wordprocessing
Ph (02) 597 1416 Fax (02) 599 1482

B.O.A. Computers Orange
Specialising in Novel Networking
Educational Computing, Agricultural
Computing, Office Management
Ph (063) 629 422 Fax (063) 631 372

Acronym Re-definition Glossary (ARG)

APC *Australian Personal Computer.* Not a computer at all, but a magazine about PCs.

AT Like XT, only faster and less old. The AT bus is a 24-bit bus, which is 8 bits more than the XT bus, and 8 bits less than the 386 bus. A bus is what electrons ride to work.

CAD Computer-aided design. The sort of profit hungry low-life who would rather use a computer than a real artist — they'll be sorry when our entire culture consists of soft drink advertisements.

CPU Central Processing Unit. In PCs, CPU usually refers to the part of the microprocessor chip that executes instructions. This used to be the whole microprocessor chip, but now with all the extra memory cache and coprocessor and so on it's only a bit of the chip.

DIP Dual In-line Package. This refers to those rectangular black objects like mutant cockroaches that populate your computer. In particular, DIP memory is supplied as chips rather than as SIMMs. Note: if your DIPs run away when you open the case, beware, they are real cockroaches.

EISA Extended Industry Standard Architecture. See introductory section.

Flops Floating point operations. May also refer to 486 machines that come out badly in *APC* tests.

ISA Industry Standard Architecture. Another way of referring to the XT or AT bus, to confuse people who have finally managed to work out what they mean.

Mips Millions of Instructions Per Second. This acronym is often interpreted as Meaningless Indication of Processor Speed, because it is so difficult to characterise what instructions a processor may execute in the course of a real program.

RISC Reduced Instruction Set Computer. Considered to be risky because they are not IBM compatible.

SIMM Single In-line Memory Module. A small printed circuit board containing memory chips and some additional circuitry that goes in a special socket, usually on the motherboard.

VGA Video Graphics Array. A video standard that provides 640 by 480 pixel colour graphics, and incorporates the earlier CGA (Colour Graphics Array) and EGA (Enhanced Graphics Array) standards. VGA cards often provide emulation of the Hercules Monochrome standard, and additional resolution (up to 1024 by 768 pixels).

XT This doesn't stand for anything, as far as I can tell; eXtra Turbo, perhaps? It is synonymous with extremely slow and old: an early model IBM PC. The electrons in an XT spend a lot of time waiting for the bus.

drivers for AutoCAD and Windows 386. It's just possible, with the power that this machine provides, that you could run Windows 386 without bogging down hopelessly. I'd be most interested to know. I didn't install either AutoCAD or Windows on the machine, as time was limited but the 256-colour VGA looked very good.

You can install an optional standby power supply to take over during brown outs and black outs. This was not supplied with the configuration tested; we know because when we pulled the plug to test the standby supply, the system went down.

The Olivetti provides many superb features for its additional cost. Olivetti also has its own version of OS/2 1.10, a copy of which was supplied to us with the review machine.

Conclusion: 486 versus 386

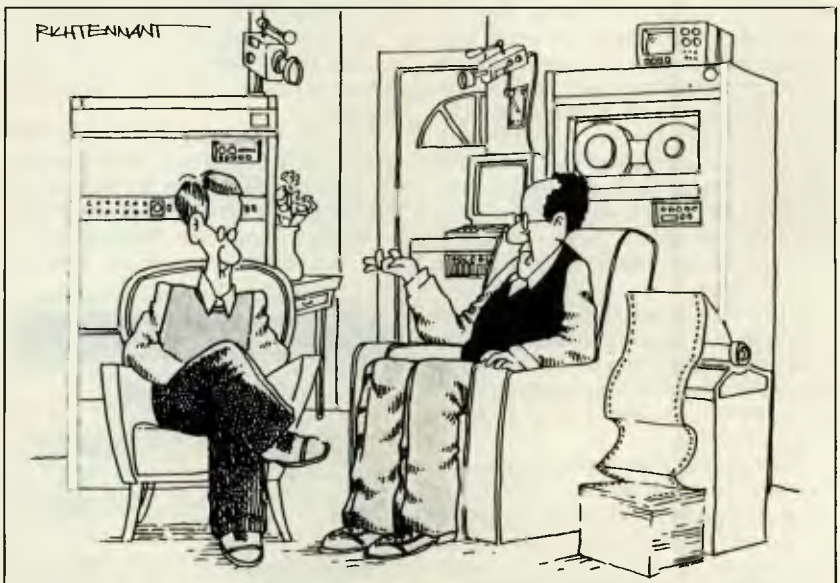
The big question is whether you should buy a 486 or a 386. The answer depends on your requirements. If you need the floating point processing power and the additional speed, the 486 is better. You can't even get a 33MHz machine as fast as the slowest 25MHz 486 machines tested. In our 386 tests last year, the Compaq 33MHz 386 claimed the prize for a low-level performance index of only 16.5, and the portable Dolch 486, the slowest of the test machines, beat this.

If you don't need that extra turn of speed, a 386 may prove cheaper for now. The 486s at this stage are at the top end of the PC market, with prices never much less than the most expensive 386 machines available. I reviewed the results for the 386 machines tested last year, and calculated a performance/price index for all of them. The results showed that a lot of the 386 machines give a higher ratio of performance per dollar than the 486 machines. This may hold for some time, because as 486 machines come down in price, you can expect 386 machines to come down accordingly.

You may just want a 486 machine because they're more fun. Examine your conscience, your bank balance, the country's balance of payments and meditate on this one. Have a good, long, hard think, and possibly a cold shower. No doubt about it, though, they are fun.

EN

Neale Morison is a consultant with Hard Copy, a Sydney technical writing company that specialises in technical and user documentation for hardware and software. He can be contacted on (02) 27 3437.



"Oh, it's nice having a completely computerised house, except once in a while it loses all of the furniture and refuses to let me in the front door, calling me an 'invalid file'."

AUSTRALIAN BUILT 8088, 80286, 80386 Based Computers

We import components and build computers in our factory, which we have owned and occupied for 30 years. Thousands of customers, like theSydney College of Advanced Education, Cumberland College of Health Science, Monash Uni, University of Technology Syd. Newcastle Uni, Macquarie Uni, Mitchell College, Uni of NSW, Cambridge College, CSIRO, Telecom, OTC, Government, business and private users will testify for our quality and service - as to prices, see for yourself hereunder. All prices include sales tax.

GCS (IBM 486 & 386 COMPATIBLE) 1MB RAM, PARALLEL, SERIAL PORTS CLOCK CALENDAR, VIDEO, DRIVER CARD, 1.2 MB DISK DRIVE, KEYBOARD , 220 W POWER SUPPLY.

SPEED	20MHZ SHADOW	20MHZ CASHE	25 SHADOW	25MHZ CACHE	33MHZ CACHE
486 PRICE				$ 7,000.00	$ 8,600.00
386 PRICE	$ 2,600.00	$ 2,900.00	$ 2900.00	$ 3500.00	$ 3,900.00

GCS AT (IBM AT COMPATIBLE) 1MB RAM, PARALLEL, SERIAL, PORTS ,CLOCK CALENDAR , VIDEO , DRIVER CARD,1.2 MB DRIVER, KEYBOARD, 180 W POWER SUPPLY

SPEED MHZ	10MHZ	12 MHZ	16 MHZ	12MHZ NEAT	16MHZ NEAT	20 NEAT
PRICE	$1,000.00	$1,200.00	$1,400.00	$1,400.00	$1,600.00	$ 2000.00

GCS XT (IBM XT COMPATIBLE) 640 KB. RAM, PARALLEL, SERIAL, G AMES PORTS, CLOCKCALENDAR, VIDEO, DRIVER CARDS, 36KB DRIVE, 150 W POWER, KEYBOARD.

SPEED MHZ	8 MHZ	10 MHZ	12 MHZ	15 MHZ
PRICE	$ 575.00	$ 599.00	$ 650.00	$ 750.00

ADDITIONAL DRIVES FOR ALL COMPUTERS ABOVE 360KB $ 130, 720KB , $150, 1 2MB, $180 1.44MB $190 HARD DISKS WITH DTC OR WESTERN DIGITAL CONTROLLERS - EXTRA 20MB, XT $430 AT $650, 30MB XT $500, AT $600 40MB XT $650, AT $750, 44 MB VC XT $900 AT $1000 71MB, XT $1200 ,AT $1300, 150MB, XT $200 , AT $2200, 270MB, XT $3800 ,AT $4000, 370MB CALL

GCS COMPUTERS USE LEGAL BIOS. OPERATING SYSTEMS ARE OPTIONAL

MS-DOS 3.3, MS-DOS 4.01 , DR-DOS, XENIX, CONCURRENT DOS, PC-MOS ARE AVAILABLE.

ALL OF THE ABOVE COMPUTERS COULD BE FITTING INSTEAD OR AS EXTRAS, WITH 360KB $140, 720KB $180, 1.2MB $200, 1.44MB $220

GCS computers use legal BIOS, MS-DOS 3.3 or 4.0 GWBASIC as well as ABLE ONE (best selling integrated program in Australia certified by Compass Research, September 87) - options are available.

SPECIAL
TOSHIBA LAPTOP COMPUTERS
T1000 $1200, T1200 $4500
T3200 $6950, T5100 $7995

We up-date and up-grade systems that could start with basic beginner's machine, replacing superseded boards and cards with the latest technology can offer, building them to powerful multi-meg RAM and hard disk drive

SPECIAL
CAD CAM Package AT computer with 20Mb Hard Disk and Monitor Generic CAD Level 3 Software 15 Dot Matrix Printer $2840 with Houston Instructments
DMP-52 Plotter $7490

SUPER SPECIAL
DESKTOP PUBLISHING PACKAGE
AT COMPUTER IMB RAM 1.2MB DRIVE 20MB HARD DISK SOFTWARE VENTURA PUBLISHING OR PAGEMAKER HANDHELD SCANNER COMPLETE WITH LASER PRINTER 6 PPM. $4999. 8 PPM $5988. 11 PPM $6975. POSTSCRIPT OPTION FOR LASERS $1981.50

HARD DISKS WITH DTCOR DIGITAL CONTROLLERS - EXTRA 20MB $500, 30MB $600, 40MB $700, 71MB $1200, 110MB $1500, 150MB $2200, 270MB $4000, 370MB CALL.

LOCAL AREA NETWORK (LAN)

WE SUPPLY INSTALL AND SERVICE LOCAL AREA NTWORS OF ANY CONFIGURATION

APX (LAN)

SIMPLE EFECTIVE AND RELIABLE. ONE DOES'NT NEED A PHD TO UNDERSTAND, INSTALL AND OPPERATE THIS SYSTEM. IT DOES ALMOST ANYTHING OTHER DO BUT WITHOUT THE THENS OF MASNUALS AND DISKETTES AND 4 TO 8 HOWERS OF INSTALLATION TIME. ONE IS AN EXPERT IN HALF AN HOUR.WHAT IS MORE IMPORTASNT IT COST IT ONLY FRACTION OF OTHRR LAN SYSDTEM OF SIMMILER POWER.

PRICE 7 USERS $ 400.00 70 USERS $ 800.00

NOVELL (LAN)

PRICE 4 USERS $850, 8 USERS $1800, 100 USERS $3,000

GCS 386 FILE SERVER 41MB HARD DISK(VC)	**$4300**
GCS 286 FILE SERVER 41MB HARD DISK(VC)	**$3000**
GCS WORK STATION	**$1000**
ARKNET CARDS	**$ 300**
ETHERNET CARDS	**$ 450**
CO-AIAL CABLES WITH FITTINGS	**$ 40**
TERINATING RESISTORS	**$ 12**

GCS Business Software - a/c payable - receivable, general ledger, stock, payroll, job costing, cash book, point of sales and others. Complete range of IBM and Apple cases keyboard, power supplies, drives main cards RAM's ROM's joysticks mouse modems at Australia's best prices - prompt repair facility and much more.

Our technicians at GCS are ready to help you with any software or hardware configuration you may require to meet your specific needs as well as your customers. For a more detailed information on our peripherals and parts for IBM and compatible XT, AT, 386 computers, please refer to our other advertisements in this publication. Call in for our free catalogue at any GCS branch or send $2 postage and handling.

GCS

SYDNEY: 67 BLACKSHAW AVENUE, MORTDALE 2223, PH. (02) 570-1215 FAX (02) 570-9063
MINTO: UNITE 4, 8 MINTO ROAD, MINTO 2566, PH. (02)820 1731, FAX (02) 603- 6844
NEWCASTLE: 653 HUNTER STREET, NEWCASTLE 2300, PH. (049) 296 061, FAX (O49) 294-767
WOLLONGONG: 74 ATCHISON STREET, WOLLONGONG 2500, PH. (O42) 298 669, FAX (042) 293-59
MELBOURNE : 65 PELHAM STREET., PHONE (3) 639-0344, FAX (O3) 639-0342
BRISBANE: 29 WOODSTOCK ROAD, TOOWONG 4066, PHONE (07) 371-3133, FAX (07) 371-7235
PERTH : 2/890 CANNING HWY. APPLECROSS 6153 WA, PHONE (09) 364-9847, FAX (09)364-5598

WE DELIVER A WIDE RANGE OF SOFTWARE ANYWHERE IN AUSTRLIA HEREUNDER ARE SOME OF THE PROGRAMS

OPERATION SYSTEMS

CONCURRENT DOS 386 6 10 USERS	$ 550
CONCURRENT DOS XM 3 USERS	$ 330
CONCURRENT DOS XM 6 USERS	$ 450
DR-DOS	$ 75
CONCURRENT XM 3 USER	$ 351
OS/2 STANDARD	$ 550
OS/2 EXTENDED EDITION	$1050
XENIX OPE 286	$ 820
XENIX DEV. 286	$ 880
XENIX VF/IX 286	$1200
XENIX OPE.386	$ 898
XENIX DEV. 386	
	$ 990

BUSINESS

GCS INTEGRATED ACCOUNTING	$ 360
GCS PAYROLL	$ 300
GCS MATERIAL LABOUR & PROFIT	
COSTING	$ 120

CAD CAM

EASY CAD 2	$ 197
MATH CAD	$ 495
DESIGN CAD	$ 299
AUTOSCETCH	$
GENERIC CAD LEVE L 3	$ 420

DATABASE

Q & A	$ 369
DBASE III PLUS	$ 754
DBASE PROGRAMMERS UTIL	$ 112
DBASE IV	$ 970
FOXBASE +	$1150
FOXBASE + FREE RUNTIME	$ 750
FOX BASE PRO	$ 975
R.BASE 5000	$ 632
PARADOX 2	$ 640
PARADOX 386	$ 775
PFS PROFILE	$ 298
R.BASE FOR DOS	$ 950
REFLEX 2.0	$ 295
CLIPPER	$ 739

FINANCE

MARKET ANALYSER PLUS	$ 518
MARKET ANALYSER PLUS PROF	$ 576
MARKET MANAGER PLUS	$ 348
MANAGING YOUR MONEY	$ 262
CASH BOOK CALL	
DOLLARS AND SENSE	$ 199

GENERAL

DESQVIEW	$ 140
DESQVIEW COMPANION	$ 110
DESQVIEW 386	$ 220
SIDEKICK PLUS	$ 220
SIDEKICK	$ 105
SIDEWAYS	$ 79
MS WINDOWS 386	$ 245
MS WINDOWS 286	$ 145
FORMTOOL	$ 140
XTREE	$ 65
XTREE PRO	$ 120
XTREE PRO GOLD	$155
SOFTWARE BRIDGE	$175

PROJECT MANAGER

HARVARD PROJECT	$ 775
MS PROJECT MANAGER	$ 575
SUPER PROJECT PLUS	$ 440
SUPUPERPROJECT E XPERT	$ 650

SPREADSHEET/INTEGRATED

FRAMEWORK III	$ 765
QUATRO	$ 210
QUATRO PRO.	$ 670
SUPER CALC 5	$ 600
SYMPHONY	$ 810
LOTUS 123 2.2	$ 675
LOTUS 123 3.0	$ 775
LOTUS EXPRESS	$ 211
MULTIPLAN	$ 258
ABILITY PLUS	$ 240
FIRST CHOICE	$ 195
MS-EXCEL	$ 545
MS-WORKS	$ 190
ABLE 1	$ 60

LANGUAGES

TRUE BASIC (STRUCTURED BASIC)	$ 110
MS COBOL COMPILER	$ 995
MS FORTRAN COMPILER	$ 674
MS MACRO ASSEMBLER	$ 235
MS BASIC COMPILER	$ 389
MS C COMPILER	$ 531
MS PASCAL COMPILER	$ 411
MS QUICK C	$ 135
MS QUICK BASIC	$ 135
MS QUICK PASCAL	$ 145
TURBO ASSEM/DEBUG	$ 185
TURBO BASIC	$ 135
TURBO BASIC DATA BASE TOOL BOX	$ 120
TURBO BASIC EDITOR TOOL BOX	$ 120
TURBO BASIC TELECOM TOOL BOX	$ 120
TURBO C	$ 175
TURBO C PRO.2	$ 320
TURBO PASCAL	$ 180
TURBO PASCAL PRO 2	$ 320
TURBO PASCAL DATA BASE TOOL BOX	$ 120
TURBO PASCAL DEVELOPERS LIB.	$ 465
TURBO PASCAL EDITOR TOOL BOX	$ 120
TURBO PASCAL GAMEWORKS	$ 120
TURBO PASCAL GRAPHICS TOOL BOX	$ 120
TURBO PASCAL NUMERICAL TOOL BOX	$ 120
TURBO PROLOG	$165
TURBO PROLOG TOOL BOX	$ 110
APL PLUS	$ 850

DESK TOP PUBLISHING

PUBLISH IT	$ 190
PAGEMAKER	$1075
DESKTOP PUBLISHERS GRAPHS	$ 210
PAGEPERFECT	$ 442
VENTURA PUBLISHING + PRO EXTENTION	$1020
FIRST PUBLISHER	$ 175
GRAMATIC IV	$ 110

COMMUNICATIONS

SUPERCOM 3	$ 135
CARBON COPY	$ 209
CROSSTALK	$ 190
CROSSTALK MARK IV	$ 295

GRAPHICS

COREL DRAW	$ 750
DR HALO III	$ 119
PRINTSHOP NEW	$ 65
HARVARD GRAPHICS	$ 510
DAN BRICKLIN'S DEMO II	$ 199
ARTS&LETTERS/GRAPHIC EDIT	$ 688
ARTS&LETTERS/PRESENTATIONS	$ 404
PICTURE PERFECT	$ 373

TRAINING

HOW TO USE PC OR XT	$ 60
PROFESSOR DOS 4.0	$ 80
INDIVIDUAL TRAINING LOTUS123	$ 80
INDIVIDUAL TRAINING DBASE III	$ 80
INDIVIDUAL TRAINING PROJECT	
MANAGER	$ 80
TEACH YOURSELF DB III PLUS	$ 80
TEACH YOURSELF DOS	$ 80
TEACH YOURSELF LOTUS 123	$ 80
TEACH YOURSELF WORDSTAR PR.	$ 80
PC INSTRUCTOR	$ 80
TYPING INSTRUCTOR II	$ 80
TYPING TUTOR IV	$ 65
TRAINING FOR DBASE III+	$ 80
TRAINING FOR LOTUS 123	$ 80
TRAINING FOR WORDPERFECT	$ 80
NORTON GUIDE:OS/2 API	$ 173
NORTON GUIDE PASCAL	$ 104
STICKY BEAR MATH 1	$ 66
MATH 2	$ 66
NUMBERS	$ 66
READING	$ 66
READING COMPREHENSION	$ 66

UTILITIES

CHEKIT (BEST PC DIAGNOSTI	$165
COPY II PC	$ 49
COPYWRITE	$ 108
PC TOOLS DELUX	$ 139
DISK TECHNICIAN	$ 187
DISK OPTIMISER	$ 69
MACE UTILITIES	$ 147
MACE UTILITIES GOLD	$ 205
FASTBACK PLUS	$ 185
NORTON COMMANDER	$ 126
NORTON UTILITIES	$ 98
NORTON UTILITIES ADVANCED	$ 155
NORTON E EDITOR	$ 81
BROOKLYN BRIDGE	$ 145

WORD PROCESSING

MULTIMATE ADVANTAGE II	$ 550
TURBO LIGHTING & WORDWIZARD	$ 185
WORDSTAR PROFESSIONAL	$ 500
MS WORD	$ 454
WORDPERFECT V 5.1	$ 540

IF THE PROGRAM YOU ARE LOOKING FOR IS NOT LISTED ABOVE PLEASE CONTACT US, WE WILL ATTEMPT TO OBTAIN IT FOR YOU,QUOTE YOU A PRICE AND INDICATE DELIVERY DATE.

GCS

SYDNEY: 67 BLACKSHAW AVENUE, MORTDALE, NSW,2223 PH. (02)570 1215, FAX (02) 570 9063
MINTO: SUITE 4/8 MINTO ROAD, MINTO, 2566, PHNE (02) 820 -1731, FAX (02) 603 6844
NEWCASTLE: 653 HUNTER STREET, NEWCASTLE, NSW 2300, PH. (049) 29 6061 FAX (049) 29 4767
WOLLONGONG: 74 ATCHISON STREET, WOLLONGONG, 2600 PH. (042) 29 8669, FAX (042) 29 3595
BRISBANE: 29 WOODSTOCK ROAD, TOOWONG, 4066,QLD. PH (07) 371 3133 FAX (07) 371 7235
PERTH: 2/890 CANNING HWY, APPLECROSS, 6153, WA. (09) 364 9847, FAX (09) 364 5598
MELBOURNE: 65 PELTHAM STREET, CARLTON VIC. 3053, PH. (03) 639-0344, FAX (03) 639-0342

PERIPHERALS & PARTS FOR IBM AND COMPATIBLE XT AT AND 386 COMPUTER

COMPUTER MOTHERBOARDS	
XT 10 MHZ NO RAM	$ 125
XT 12MHZ NO RAM	$ 180
XT 15MHZ NO RAM	$ 200
AT 12MHZ NO RAM	$ 315
AT 16MHZ NO RAM	$ 500
AT 16MHZ NEAT NO RAM	$ 700
AT 20MHZ NEAT NO RAM	$ 900
386 20MHZ SUPPORTS SHADOW USA MADE	$1500
385 20MHZ SUPPORTS CASHES USA MADE	$1900
386 25MHZ SUPPORTS SHADOW USA MADE	$1800
386 25MHZ SUPPORTS CACHE USA MADE	$2400
386 33MHZ SUPPORTS CACHE USA MADE	$2800
486 25MHZ USA MADE	$5900
486 33MHZ USA MADE	$7500
VIDEO CARDS	
CGA WITH PRINTER PORT	$ 80
MGA WITH PRINTER PORT	$ 100
CGA/MGA (MANUAL CHANGE) W/PRINTER PORT	$ 120
CGA/MGA (AUTO CHANGE) W/PRINTER PORT	$ 150
EGA 640 X 350 W/PRINTER PORT	$ 200
EGA 1024 X 480 W/PRINTER PORT	$ 300
VGA CARD	$ 210
VGA 16 BIT CARD	$ 300
DRIVER CARDS	
360KB FD CONTROLLER	$ 50
1.2 MB FD CONTROLLER	$ 75
360 720KB 1.2MB 1.44MB - CONTROLLER 2 DRIVERS	$ 100
360 720KB 1.2MB 1.44MB -CONTROLLER 4 DRIVERS	$ 180
XT HARD DISK CONTROLLER FMF	$ 89
XT HARD DISK CONTROLLER RLL	$ 110
AT-386 HD FD CONTROLLER FMF (WD OR DTC)	$ 250
AT-386 HARD DISK CONTROLLER RLL (WD OR DTC)	$ 355
IAT-386 HD HD CONTROLLERS ESDI (WD OR DTC)	$ 450
/0 CARD WITH 360 DRIVE CONTROLLER	$ 100
I/0 CARD WITH 360 1.2 620 1.44 CONTROLLER	$ 130
2 SERIAL, 1 ON, 1 PARALLEL CARD	$ 90
2 SERIAL, 2 ON, 1 PARALLEL CARD	$ 120
4 SERIAL, 1 ON CARD	$ 120
4 SERIAL, ALL ON CARD	$ 250
POWER SUPPLIES	
150 WATT	$ 120
180 WATT	$ 150
200 WATT	$ 200
220 WATT	$ 250
DISKETTES	
GCS 5.25 360KB X10	$ 10
GCS 5.25 1.2MB X 10	$ 40
GCS 3.50 720KB X 10	$ 35
GCS 3.50 1.44MB X 10	$ 50
LOCAL AREA NETWORK	
ARCNET BOARDS	$ 275
ETHERNET BOARDS	$ 425
PASSIVE HELP	$ 50
ACTIVE HELP	$ 490
CABLE FITTINGS	CALL
NOVELL ELLS NETWARE 4 USERS	$ 850
NOVELL NETWARE 8 USER	$1750
APX LAN 7 USERS	$ 400
APX LAN 72 USERS	$ 800
DISK DRIVES	
360KB 5. 1/4 FLOPPY DRIVES	$ 130
1.2MB 5. 1/4 FLOPPY DRIVES	$ 150
720KB 3. 1/2 FLOPPY DRIVES	$ 150
1.44MB 3. 1/2 FLOPPY DRIVES	$ 190
21 MB HARD DISK	$ 320
30 MB HARD DISK	$ 370
42 MB HARD DISK	$ 490
41 MB HARD DISK VOICE COIL FOR AT ONLY & CONTRLR	$ 750
44 MB HARD DISK VOICE COIL FOR XT AND AT	$ 660
71 MB HDRD DISK VOICE COIL FOR XT AND AT	$1200
110 MB HARD DISK ESDI	$1500
170 MB ESDI	$1750
350 MB ESDI	$3850
MONITORS	
12 INCH MONOCHROME	$ 175
12 INCH DUAL FREQUENCY	$ 200
14 INCH DUAL FREQUENCY	$ 210
14 INCH RGB	$ 450
14 INCH EGA	$ 650
14 VGA COLOUR	$ 695
14 INCH MULTISYNC	$ 900
PRINTERS	
135 CPS 9 PIN 80 COLUMN	$ 300
160 CPS 9 PIN 80 COLUMN	$ 425
135 CPS 9 PIN 132 COLUMN	$ 695
180 CPS 24 PIN 10 COLUMN	$ 640
180 CPS 24 PIN 132 COLUMN	$ 940
LASER PRINTER 6 PPM	$2200
LASER PRINTER 8 PPM	$2850
LASER PRINTER 11 PPM	$3200
POSTSCIPT LASER PRINTER 8 PPM	$4700
POSTSCRIPT FOR HP, CANON, RICHO 2.5 MB RAM	$1850
POSTSCRIPT " " " " 4.5 MB RAM	$2600
RAM EXPANSION CARD 4 MB RAM FOR HP LASER	$ 496
INTEGRATEDCIRCUITS	
4164 RAM	CALL
41256 RAM - 12,-10,-8	CALL
41464 RAM	CALL
414256 RAM -12,-10,-8	CALL
411000 RAM -12,-10,-8	CALL
MATHS CO-PROCESSOR	
8087	$ 200
8087-2	$ 275
8087-1	$ 350
80287-6	$ 350
80387-10	$ 450
80387-16	$ 700
80387-20	$ 850
80387-25	$1050
80387-33	$1350
MODEMS	
1200 BPS 300 BPS INTERNAL	$ 210
1200 BPS 300 BPS 1200/75 BPS	$ 300
2400 BPS 1200 BPS 300 BPS INTERNAL	$ 350
9600 BPS	$2000
FAX CARD	$ 695
RAM CARDS	
384 KB RAM CARD FOR EX COMPUTER	$ 60
2MB LIM EMS 4.0 ABOVE MEMORY CARD FOR XT	$ 170
2MB LIM EMS 4.0 ABOVE MEMORY CARD FOR AT AND 386	$ 200
MISCELLANEOUS	
PARALLEL CABLES	$ 12
SERIAL CABLES	$ 12
CENTRONICS PRINTER CABLE	$ 20
RS232 PRINTER CABLE	$ 20
2 WAY PRINTER SWITCH CABLE	$ 50
84 KEY KEYBOARD	$ 75
101 KEY KEYBOARD	$ 110
XT CASE	$ 80
AT CASE	$ 100
MINICASE FOR XT AND AT COMPUTERS	$100
TOWER CASE FOR XT, AT AND 386 COMPUTERS	$ 300
MINITOWER CASE FOR XT, AT AND 386 COMPUTERS	$ 180
MS MOUSE	$ 195
SERIAL MOUSE	$ 130
BUSS MOUSE	$ 130
JOYSTICK	$ 35
EPROM PROGRAMMER ONE CHIPS	$ 275
EPROM PROGRAMMER 4 CHIPS	$ 320
COPY CARD	$ 150
COPY II PC COPY CARD	$ 220
TABLE TOP IMAGE SCANNER	$2600
HAND HELD SCANNER 200,300,400 DPI	$ 300
HAND HELD SCANNER WITH OCR	$ 400
JOYSTICK CARD 2 PLAYERS	$ 60

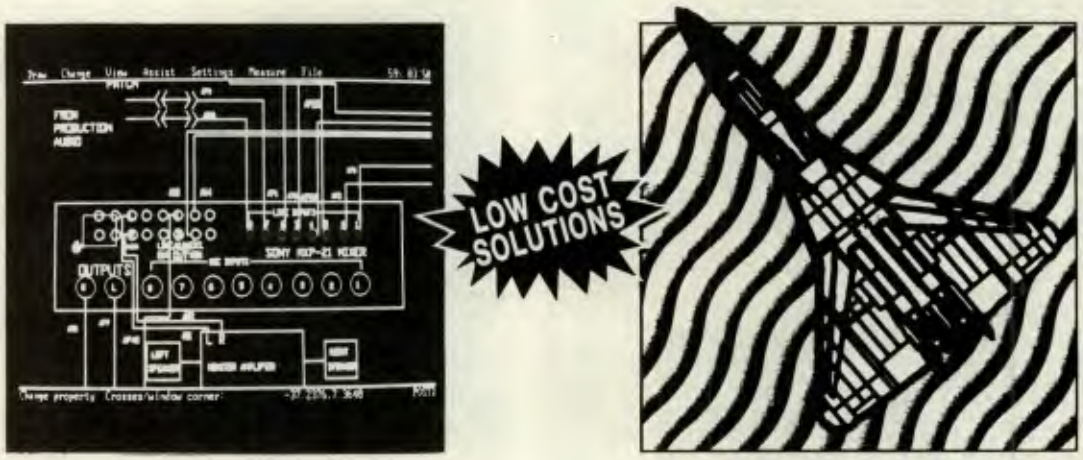
WE ALSO BUILD, UPGRADE, SERVICE AND REPAIR IBM AND COMPAITBLE PERSONAL COMPUTERS OF OR TO ANY CONFIGURATION, ON CASUAL OR CONTRACTBASIS

GCS

SYDNEY: 67 BLACKSHAW AVENUE, MORTDALE 2223, PH. (02) 570-1215 FAX (02) 570-9063
MINTO: UNITE 4, 8 MINTO ROAD, MINTO 2566, PH. (02)820 1731, FAX (02) 603- 6844
NEWCASTLE: 653 HUNTER STREET, NEWCASTLE 2300, PH. (049) 296 061, FAX (049) 294-767
WOLLONGONG: 74 ATCHISON STREET, WOLLONGONG 2500, PH. (042) 298 669, FAX (042) 293-59
MELBOURNE : 65 PELHAM STREET., PHONE (3) 639-0344, FAX (03) 639-0342
BRISBANE: 29 WOODSTOCK ROAD, TOOWONG 4066, PHONE (07) 371-3133, FAX (07) 371-7235
PERTH : 2/890 CANNING HWY. APPLECROSS 6153 WA, PHONE (09) 364-9847, FAX (09)364-5598

Draw and design with

AUTODESK



At Autodesk, we believe in helping you be as productive as possible. We also believe your P.C. should be able to do more than word processing or spreadsheets.
Through our innovative and fully supported software range, Autodesk can open your door to stunning computer-aided drawing, design, paint and animation.
Our low-cost packages help you get maximum value from your P.C. You're only limited by your imagination.

AUTOSKETCH

Autosketch is a powerful drawing tool designed to help you produce plans, diagrams and layouts with the click of a mouse.
It's the ideal introductory drawing package for draftsmen, designers, builders, architects, town planners, engineers, interior designers, students – in fact, just about anyone!

AUTODESK *Animator*

Paint and Animate with Autodesk Animator.

This unique software gives you total freedom to produce stunning, high quality colour video on your P.C. With Autodesk Animator you can create, edit and replay an infinite range of special effects and colour graphics. Autodesk Animator is the tool that will assist you in a Business Presentation training session or Sales Demonstration. No longer do you need slides or overheads. Autodesk Animator can convey your ideas with dramatic impact and clarity.

Generic™ CADD

Designing with Generic CADD our computer-aided drafting and design package is easy. Voted US 'P.C. Magazine's' "Editor's Choice," Generic CADD gives you sophisticated CAD power on your P.C. Fast yet affordable Generic CADD will transport you to new frontiers in design.

AUTODESK PTY. LTD.

9 CLIFTON STREET
RICHMOND VICTORIA 3121
PHONE: (03) 429 9888

AUTODESK

APC

FREE DEMO

PLEASE SEND MY FREE DEMO DISK TO:

PLEASE SEND TO:

AUTODESK
9 CLIFTON ST.
RICHMOND 3121

NAME: .....
TITLE: .....
ADDRESS: .....
SUBURB: .....
POSTCODE: .....
TELEPHONE: .....

AUTODESK ANIMATOR (VGA ONLY) ☐
AUTOSKETCH (EGA) ☐
GENERIC CADD (EGA) ☐

A better dBASE

Steven Vaughan-Nicols says Fox Software's FoxPro has pushed the dBASE language to its limits, and looks set to trump Ashton-Tate's ace.

For many years, despite determined competition, Ashton-Tate has been the dominant player in the dBASE game. Now, that could change. Fox Software's newest entry in the race is a clear winner over the other challengers.

FoxPro 1.00 is not just the latest bid to trump Ashton-Tate's troubled dBASE IV. Fox Software's $1320 package has far more going for it than shaving a few milliseconds off indexing or adding a few dozen more procedures or commands, although it does do all that. Besides providing a high-performance superset of dBASE III Plus and IV commands, FoxPro brings a character-based windowing interface to the PC by way of the well-received FoxBASE+ Mac. As a result, dBASE programming will never be the same.

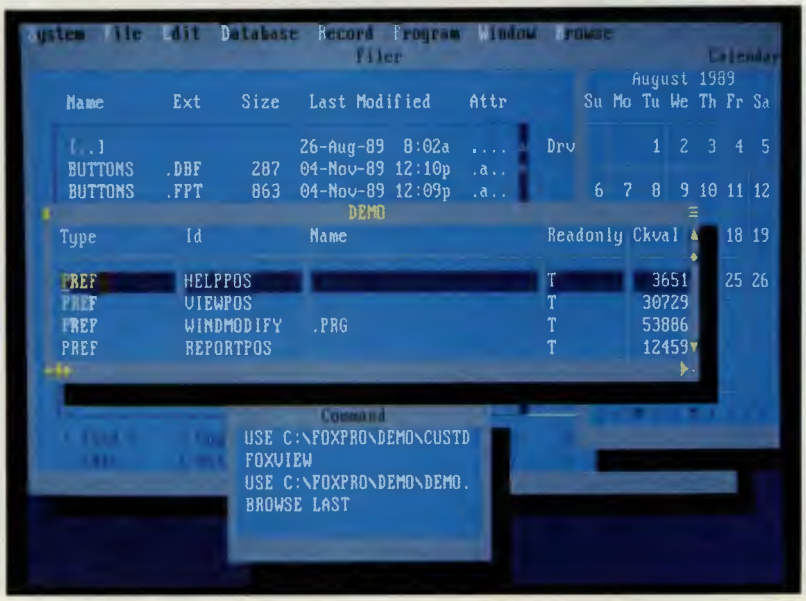
FoxPro also comes with a non-procedural, object-oriented front end for its database manager. You can still use the keyboard with the new interface, but the program works best when you use a mouse. The FoxPro interface is about as far removed as you can get from the dot prompt and still be dBASE compatible.

The new interface isn't just for DOS-phobic users, though. Even the most dyed-in-the-wool command-line programmers will be impressed by FoxPro's ability to dynamically move, resize and temporarily erase windows. It is possible to have an editing, a trace, a debugging and an output window all either on-screen or a mouse-click away. Combine this with the ability to dynamically set breakpoints, a source code-level debugger, blazingly fast speed and compatibility with both its own and Ashton-Tate's products, and you have a state-of-the-art dBASE development environment.

That is all very nice in theory, but dBASE IV 1.0 was also supposed to be the greatest thing since sliced bread until the bugs started popping up. To get my feet wet with FoxPro and to see how well it really worked, I performed a major overhaul on a 3000-line application that had started life in dBASE III Plus, and whose code had been expanded during a brief fling with Clipper.

Code repair made easy

Installing FoxPro was a breeze. The program, weighing in at more than 3M, comes in compressed form on merely five 360K floppy disks. The installation program works automatically and, with a minimum of fuss and bother, transfers the program to your hard disk and then expands it without trying to rewrite your AUTOEXEC.BAT or CONFIG.SYS files. You will probably need to change your CONFIG.SYS file though, because FoxPro needs every file handle it can get. The company recommends that your CONFIG.SYS be set to at least 40 files.



FoxPro brings the look and feel of menus to the dBASE language

The documentation that comes with the program is well written. It's arranged in such a way that it's easy to use whether you're a novice learning the program or a grizzled dot-prompt veteran looking for examples of obscure command syntax. Unfortunately, the program it is written about isn't quite the same as the one you get. The release notes include no fewer than 47 pages of errata and additions to the main documentation. It's nice knowing the changes made, but I wish the company had integrated the information directly into the manuals, where it belongs, even if it meant delaying the program's release.

I had never seen my project's code before, so the first thing I did was to turn FoxPro's integrated documenter, FoxDoc, loose on it to see what it could make of the hundred or so procedures and 50 programs. About three minutes later, I was looking at a system summary that included a complete tree structure, a variable cross-reference list and summaries of indexes, formats, labels, procedures and report files. FoxDoc prettied up the code and added comments that included file and procedure calls, and listings of all called data and format files. This was a world of improvement over the documentation that came with my program — none. For this alone, I can highly recommend FoxPro to the legion of dBASE code repairers.

After going through the code, I then began tuning it up and adding the new programs required to expand the system's capacities. Again, FoxPro proved to be a godsend. It let me easily jump from watching the program's output to tracing the code and then to watching my debugging routines while dynamically setting variables and breakpoints.

Compared with previous FoxBASE releases, FoxPro has expanded support for user-defined functions. It's still not the equal of Clipper in this respect, though. You can't directly link C or assembly code for that extra performance edge. For this application, however, I could live without that ability.

FoxPro's internal editor is good, but I missed the WordStar-compatible commands of Ashton-Tate's editor. Still, it has one outstanding feature that I wish more true word processors had: it lets you retrieve any text deleted during an editing session. On the minus side of the balance, while the editor lets you move and copy text from window to window, it requires an extra step to do it. In theory, FoxPro allows you to call an outside editor in place of its internal editor. In practice, there wasn't enough memory left over for WordStar 5.5, my editor of choice.

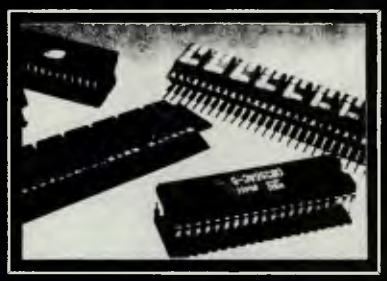
Quick and compatible

Despite its graphical user interface, FoxPro is impressively quick. A first look at FoxPro might make you think that it would be as slow as many Microsoft Windows-based programs. That's because its text-mode windows require only a fraction of the display memory that a true GUI requires. The end result is one of the smoothest and fastest windowing interfaces around.

The Browse command is also better than previous implementations. It now has two types of window formats. The first is the usual spreadsheet-like format, while the other corresponds to an Edit window. You can toggle between the two layouts at will. The real strength of the new-and-improved Browse is the ability to dynamically choose what fields or subsets of fields will be displayed, their size and the order in which they will be displayed.

Despite some difficulties, mostly with Clipper commands that FoxPro doesn't support, I was able to finish the project in about half the time it would have normally taken me — and that includes learning time. There is one caveat to this. I was using a mouse. If I had relied on the keyboard alone to get my work done, it would have gone much more slowly. It's not that the program's key selections are poor, it's just that the program is at its best when mouse-driven.

FoxPro proved to be perfectly compatible with the dBASE III Plus dialect of dBASE. A series of tests on a number of dBASE IV programs revealed no problems

IMS
INTEGRATED MEMORY SYSTEMS
BEST PRICES!!!
ALL PARTS STOCK – NEXT DAY DELIVERY!!
SIMMS AND SIPPS ARE OUR SPECIALTY, WE STOCK LARGE QUANTITIES OF 256 x 8's & 9's and 1MB x 8's & 9's.
DYNAMIC RAM
EPROM
STATIC RAM

SIMM MODULES
SIPP MODULES
STATIC MODULES
INTEL MATH COPROCESSORS
MEMORY UPGRADES
bankcard
AST
COMPAQ
ZENITH
IBM PS/2
APPLE MAC
HEWLETT PACKARD
TOSHIBA LAPTOP
ALR
CLEVELAND
SUN MICRO SYSTEMS
AMSTRAD
MasterCard
CALL TOLL FREE (008) 074 039
SERVING ALL OF AUSTRALIA

3 REASONS WHY YOU SHOULD PURCHASE YOUR NEXT SOFTWARE FROM US

PRODUCT VARIETY

WE SUPPLY VIRTUALLY **ALL U.S. MANUFACTURED SOFTWARE** INCLUDING THE MOST POPULAR TITLES & THE LATEST VERSIONS IN 3 1/2" OR 5 1/4" FORMATS FOR IBM, MACINTOSH AND OTHER BRAND NAMES OR COMPATIBLE EQUIPMENT.

WE SUPPLY OVER 5,000 TITLES

ALL INCLUSIVE PRICE

WE QUOTE ONE PRICE THAT INCLUDES ALL COSTS AND YOU ARE QUOTED AND PAY IN AUSTRALIAN DOLLARS.

NO ADDITIONAL CHARGES FOR:

- FREIGHT / DELIVERY
- CREDIT CARDS
- SALES TAX
- DUTY
- EXCHANGE RATE
- PROCESSING & HANDLING

NO HIDDEN CHARGES

PRICE GUARANTEE

WE WILL BEAT ANY AUSTRALIAN NATIONALLY ADVERTISED PRICE ON ANY U.S. MANUFACTURED SOFTWARE PRODUCT.

NO ANDS, IFS, OR BUTS.

U.S.A.'S TOP SELLERS

1) 1-2-3- LOTUS
2) WORDPERFECT
3) HARVARD GRAPHICS
4) MICROSOFT WORD
5) dBASE III PLUS
6) PFS:FIRST CHOICE
7) MULTIMATE ADVANTAGE II
8) MICROSOFT WINDOWS
9) MICROSOFT EXCEL
10) FIRST PUBLISHER
11) PROFESSIONAL WRITE
12) MICROSOFT WORKS
13) Q & A
14) NORTON UTILITIES ADV.
15) FASTBACK PLUS
16) RIGHTWRITER
17) SYMPHONY
18) APPLEWORKS
19) TOPS
20) PAGEMAKER
21) MACDRAW II
22) MACWRITE
23) FILEMAKER II
24) MACPAINT
25) SUPERPAINT

HOW TO ORDER

1) SELECT THE SOFTWARE YOU NEED MAKING SURE YOU KNOW:
   - THE MANUFACTURER
   - PRODUCT TITLE
   - VERSION
   - DISC SIZE
   - TYPE & MODEL OF COMPUTER USED
2) HAVE YOUR VISA OR MASTERCARD AVAILABLE.
3) HAVE YOUR SHIPMENT ADDRESS AVAILABLE.
4) CALL THE U.S.A. **AT OUR EXPENSE.**

0014 - 800 - 125 - 713

PHONE LINE OPEN FROM
7AM. - 5 PM.
EASTERN AUSTRALIAN TIME

OUR WARRANTY

* WE ASSUME THAT YOU, THE BUYER, HAVE A REASONABLE AMOUNT OF EXPERTISE IN INSTALLING AND OPERATING THE SOFTWARE YOU ARE PURCHASING. IF YOU DO NOT, WE SUGGEST THAT YOU CONTACT YOUR LOCAL DEALER, PAY THE HIGHER PRICE, AND RECEIVE THE ADDED TRAINING AND SUPPORT.
* WE WILL REPLACE ANY DEFECTIVE SOFTWARE FOR A 60 DAY PERIOD AND ABSORB ALL COST.
* WE WILL EXCHANGE ANY **UNOPENED** SOFTWARE THAT YOU ORDERED BY MISTAKE WITHIN A 30 DAY PERIOD.

INTERNATIONAL HOUSE INC.
7721 E. GRAY ROAD, SUITE 102
SCOTTSDALE, ARIZONA USA 85260

VISA MasterCard

TEL : (602) 991 - 9773
FAX : (602) 991 - 2041
FREEFONE : 0014 - 800 - 125 - 713

with the newer language variant. Unlike its Ashton-Tate predecessor, FoxPro proved to be bug-free.

The program also has no trouble dealing with dBASE IV's database and index structures, with the exception of dBASE IV's master index format (.MDX). Make no mistake about it, though, FoxPro is a superset of dBASE. Its indexes and memo formats are not backward compatible with Ashton-Tate's products.

In particular, FoxPro's new memo format is not like anything seen before in dBASE. New memo fields are unlimited in length — if you want to have a megabyte-size memo, you can. To make these monstrous memos more manageable, they can be searched and manipulated by several of the more important string functions, including the AT( ) and SUBSTR( ) subroutines. This goes a long way towards making memos more tractable for serious applications. FoxPro can also store binary data in string or memo fields. You can keep digitised images, sounds and executable files all within the database. Putting binary data to use in the system isn't easy. For this release, the feature is more of a neat trick than a useful tool.

Pluses and minuses

One thing you can always count on in any new dBASE program is that its makers will claim that their new index structure is smaller and faster than its forerunners. The makers of FoxPro are no exception. But while it may have the fastest indexing routines, they're not always the most efficient in terms of space. FoxPro indexed my files as much as 47 per cent faster than dBASE IV with only a minimal amount of expanded memory (see Table 1). However, file size was more of a toss-up. For simple index expressions, FoxPro made files an average of 10 per cent smaller than dBASE IV's. When an index was based on a long, compound string key, dBASE IV was marginally more efficient.

I based my comparisons on eight indexes — six for a database with 837 records (Database 1) and two for a database with 1470 records (Database 2). The names, types and lengths of the fields used are shown in Table 2.

I ran the tests on a 286 AT compatible running at 12.5MHz with 640K of conventional memory and 384K of expanded memory. The system also had an 80M Plus Development Hardcard II disk drive with a BIOS disk access speed of 28ms and a 128K hardware disk cache.

There are two points where dBASE IV still has the edge. The first is automatic screen generation — Ashton-Tate's product is easier to handle. The second is the report generator: I rate FoxPro's as equal to dBASE's except for one significant shortcoming. The other dBASE variations let you directly edit a report's code; you can't do this with FoxPro.

The company claims that its report generator is so complete that you'll never need or want to meddle directly with the code. Wrong. Expert dBASE programmers will still want to get their hands dirty working directly with the report's format. Still, for the computerphobes in the office, the non-procedural, object/event-oriented front end of FoxPro's report generator is easier to approach than that of dBASE.

One of the more remarkable things about FoxPro is that it manages to perform its tricks in as little as 512K of RAM and on your typical 70ms, slow-as-death, XT-class hard disk drive. It's not fun, mind you, and the program really slows down, but you can do it. FoxPro sings, however, when used with a fast chip and EMS 4.0 memory — the more of the latter, the better. FoxPro will also put any 80x87 numeric coprocessors in your PC to good use. One thing to be noted, however, is that FoxPro is very sensitive to its environment. Even a small reduction in RAM, either normal or expanded, can make a big difference in its performance.

Index performance: FoxPro vs dBASE IV

	Database 1 indexes						Database 2 indexes	
	1	2	3	4	5	6	1	2
Time to create (seconds)								
FoxPro	6.0	5.6	3.8	4.8	8.5	7.1	5.0	5.7
dBASE IV	11.3	7.0	6.8	5.6	10.4	8.8	8.7	9.1
Index file size (bytes)								
FoxPro	15,360	10,752	10,752	8192	72,192	72,192	43,520	20,480
dBASE IV	19,456	14,848	14,848	11,264	70,656	70,656	45,568	21,504

Note: Indexes were created based on the following expressions:

Database 1:
1. index on str(year (date),4)+str(month(date),2)+str(day(date),2)+tape_no to date
2. index on trim(tape_no) to number
3. index on trim(format)+trim(tape_no) to format
4. index on trim(location)+trim(tape_no) to location
5. index on trim(subject)+(tape_no) to subject
6. index on trim(title)+trim(tape_no) to title

Database 2:
1. index on trim(key) to keys
2. set unique on index on trim(key) to uniq_key

Table 1 FoxPro averaged about 30 per cent faster than dBASE IV, but the efficiency (ie, size) of the files created was more of a toss-up

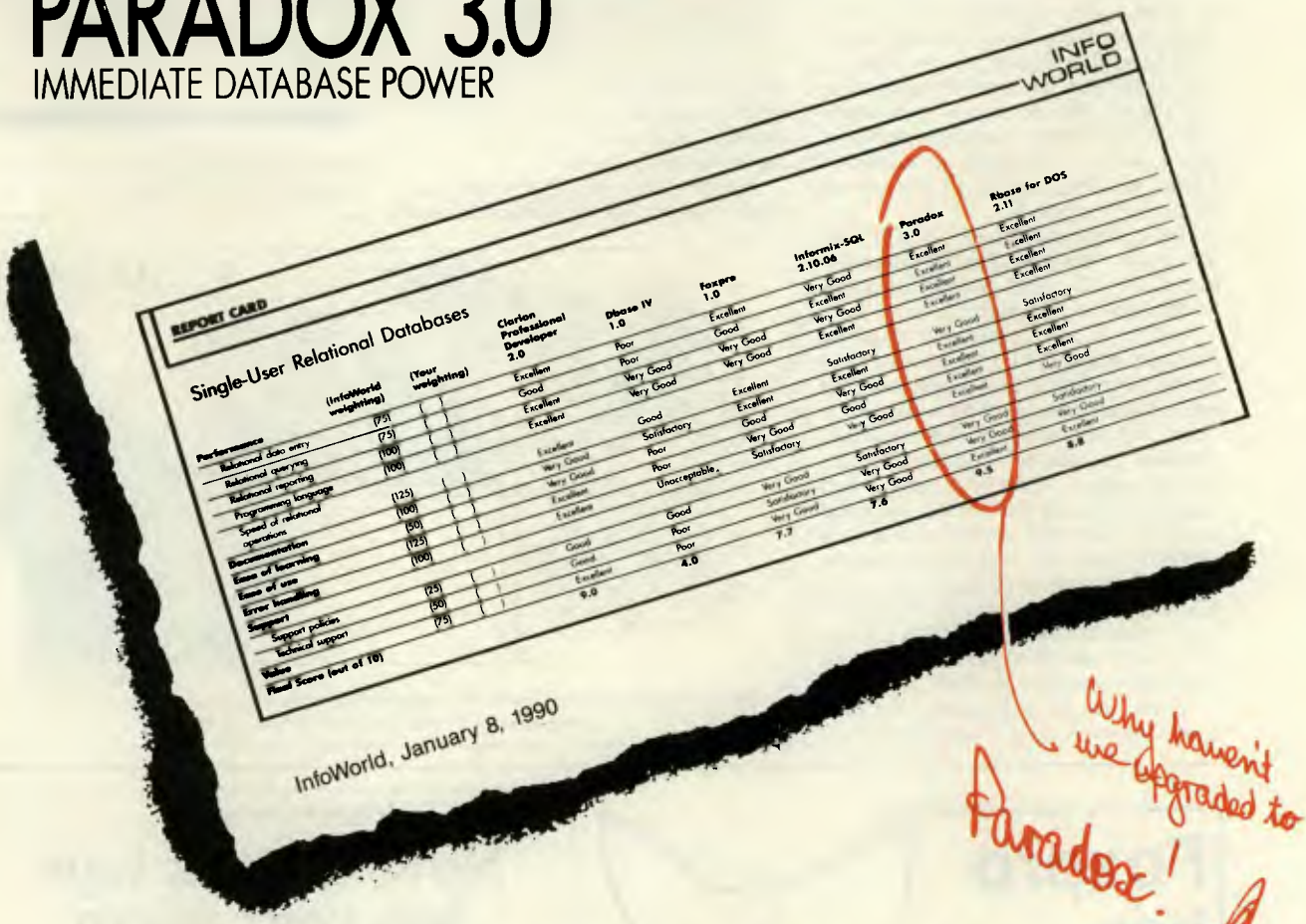
Benchmark database makeup

Field name	Field type	Length
Database 1		
Date	Date	8
Format	Character	3
Location	Character	3
Subject	Character	60
Tape_No	Character	4
Title	Character	60
Database 2		
Key	Character	20

Table 2 Of the two databases used to compare FoxPro and dBASE IV, the first consisted of 837 records using several key fields, while the second contained 1470 records and only one key field

dBASE USERS
UPGRADE TO PARADOX 3.0 **BORLAND'S POWERFUL DATABASE**

PARADOX® 3.0
IMMEDIATE DATABASE POWER



dBase Upgrade Offer

for $260 until JUNE 30, 1990

☐ Please send me more information on Paradox
☐ Please upgrade my dBase, serial # _____
☐ Cheque enclosed $ _____ for _____ copies.
Media 5.25" ❑ 3.5" ❑

Name: _____ **Title:** _____

Company: _____

Address: _____

_____ **Postcode:** _____

BORLAND
P.O. Box 264, Lane Cove NSW 2066
Phone: (02) 418 7330 Fax: (02) 418 7307

APC5

The bottom line is 9.5

BORLAND

Of course, FoxPro isn't perfect. The program claims to 'compile' files, but it doesn't. FoxPro creates and runs object code faster than it runs source code. You can create true run-time programs only with the purchase of the not-yet-available FoxPro unlimited run-time package, which will set you back an additional $840. You can't simply buy a professional developer's package.

The current package isn't ideal for LAN use, either. However, Fox Software says that it is working with Novell to produce FoxPro/LAN for NetWare.

FoxPro is not a relational database manager and doesn't support Structured Query Language. This is a problem. The relational database model is the wave of the future. SQL, the language of the relational database management system, provides fundamentally stronger query and manipulation tools than dBASE, but good microcomputer SQL implementations are still hard to find. The company says that the next major release of FoxPro will include a SQL interface, but it will take more than that to make a DBMS relational. It is a step in the right direction, though, and I look forward to seeing the revision.

If you just want to access your data quickly or whip up a simple report, you will be very happy with Fox Software's new product. FoxPro brings more than just a Mac look to the DOS environment. You can master the bread and butter of simple database design (ie, data entry and report generation) quickly and easily in FoxPro. The program would make a fine choice for most offices.

FoxPro stretches the single-user, single-machine flat-file database model about as far as it can go. I wish it included SQL and improved LAN suitability, but despite these reservations, I plan to use FoxPro for most of my dBASE applications development.

END

FoxPro costs $1320 and is available from PC Plus, tel: (03) 233 7955.

"Well, we took a poll and found that what people really wanted wasn't more power or increased applications, but really groovy tail fins."

Foxpro has arrived!

Foxpro is three times faster than its own speed champ, FoxBASE+; eight times faster than dBASE IV; and sixteen times as quick as dBASE III PLUS.

Stock is available of Foxpro, Foxbase 2.1, and FoxMac for both multi-user and single-user. Upgrades are availbale for Foxbase development to Foxpro development.

For enquiries phone **(03) 596 7830**

Fox Software

Nothing Runs Like The Fox.

Available from Resolution Systems, 152 Martin Street, Gardenvale, Victoria 3185

Desktop 9-Track Tape Subsystem

Now, 9-track tape lets your micro exchange data with minis and mainframes

Simply exchange data files on a reel of 9-track tape.

9-TRACK is the first choice for file interchange among data processing professionals. Now, Qualstar's low cost 1/2-inch 9-track Streaming tape systems bring full ANSI data interchange to IBM PCs or Macintosh, giving your micro the freedom to exchange data files with nearly any mainframe or minicomputer in the world.

Available in both 7" and 10-1/2" versions, compact Qualstar tape drives can sit on your desktop, *using less space than an ordinary sheet of paper.* Systems include DOS or XENIX compatible software, coupler card and cables. High reliability 1600 or 6250 BPI capability may be used for disk backup as well as data interchange. Discover the big advantage 9-track tape has over other micro/mainframe links.

DEC HP ALTOS NCR — IBM MAINFRAMES — AT&T UNISYS APOLLO SUN

#1 Selling 9-Track Systems on the Desktop

FOR DETAILS AND TO ORDER
FAX (818) 882-4081
PHONE (818) 882-5822

QUALSTAR

KEYDATA PTY LTD
VIC: (03) 629 2905
SYD: (02) 262 4400
ACT: (062) 51 5133

9621 Irondale Ave., Chatsworth, CA 91311

© 1989 Qualstar Corp All product and company names and trademarks are the exclusive property of their respective owners.

WYSIWYP - What You See Is What You Project

File Edit Options Text Mask Effects
Use Fill Effect
Use Shadowing
Use Both
Replace Foreground with Blend
Reverse Color Range
Special Effects
Other
(Actual projection)
Project eight bright colors directly from your computer: blue, white, red, black, magenta, cyan, green and yellow

ELECTROBOARD PCV5 COLOUR VIEWER

Project the right image — in brilliant colour — and your presentation will be bang on target

See these colours? They're bright. Brilliant. Vibrant. Because the colours are being projected just as they appear on your computer screen. they are projected by the true-colour, Liquid Crystal Display projection panel from ELECTROBOARD — the PCV5 Colour Viewer.

With eight true colours, upgradeable to the PCV5CX with sixty four colours — the PCV5's palette can produce a multitude of variations. And its 640 x 480 high-resolution display works with IBM, IBM compatibles, laptops and the Apple Macintosh family of Personal Computers.

Simply place the PCV5 on your overhead projector and coloured graphs, charts, text and spreadsheets — whatever appears on your computer screen — can be displayed to the entire room in full, true colour.

Perfect for presentations, lectures, board meetings, conferences and anywhere you want to impress an audience. Large screen projection is now simple and easy.

ELECTROBOARD also offers a range of P.C. Viewers to suit different purposes and requirements, including memory modules, black/white and blue/yellow LCD's.

So call ELECTROBOARD for a demonstration today. And make your presentations look truly brilliant.

ELECTROBOARD PTY LIMITED

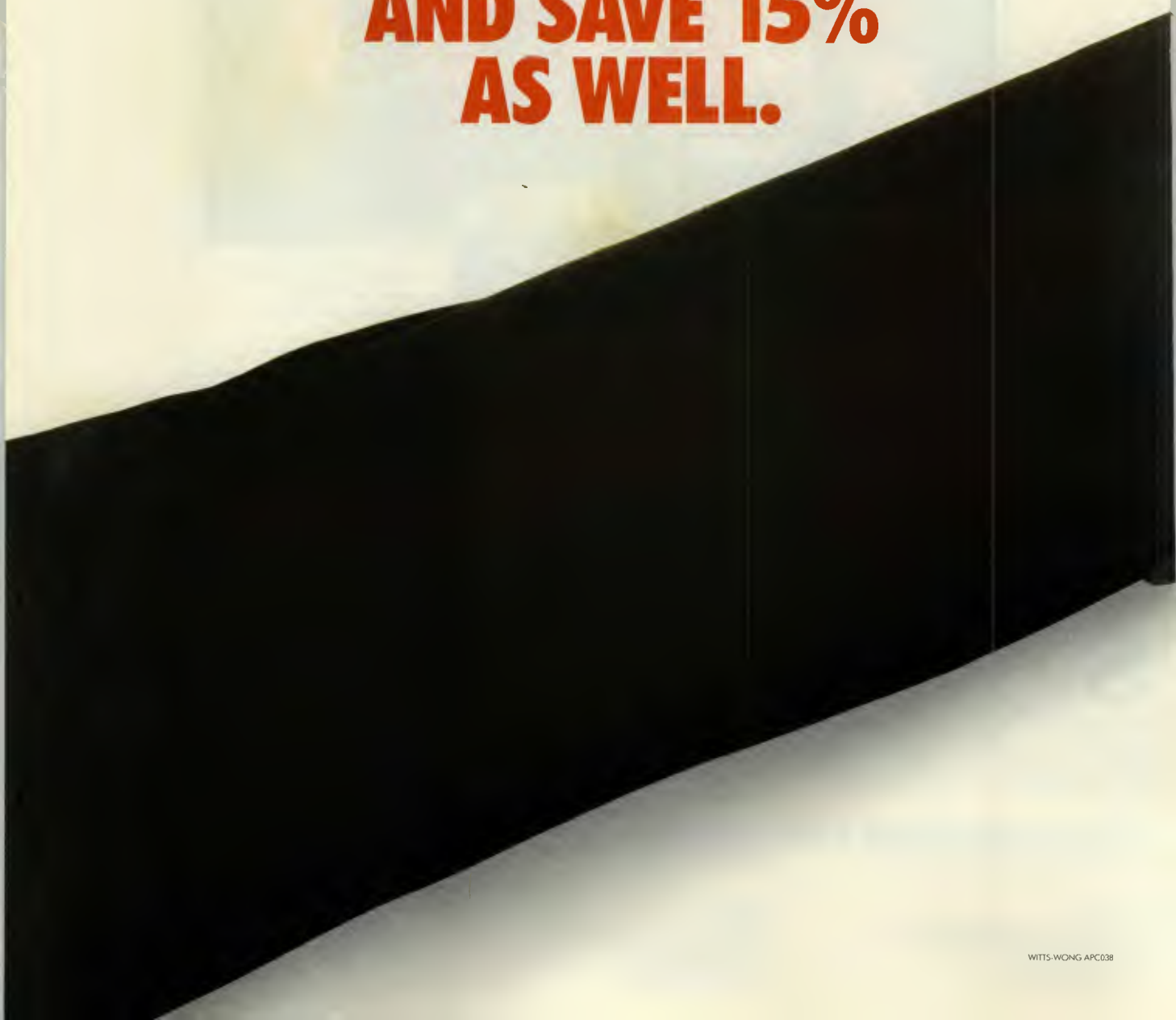
(Inc. in N.S.W.)

Sydney:
12th Floor, 275 Alfred Street North
North Sydney, N.S.W. 2060
Tel: (02) 957 5842
Fax: (02) 922 1885

Melbourne:
Suite 3, 711 High Street
East Kew, Vic. 3102
Tel: (03) 859 9555
Fax: (03) 859 9316

P.C. Viewers are available under Federal Government Contract.

HOW TO GET YOUR HANDS ON THE COMPUTER JOURNAL OF THE YEAR AND SAVE 15% AS WELL.



WITTS-WONG APC038

From TTY to VUI

As computers become more complex, using them becomes easier and easier, due to developments in user interfaces. Frank Hayes investigates their advantages and disadvantages, and looks at how they compare.

What makes a good user interface? That is not a simple question. Designers have been struggling for decades to create architectures that let you get the most from your software. There are questions of priorities. Should the user interface maximise performance for experts or shorten the learning curve for beginners? Is safeguarding data more crucial than efficiency? And which should take priority: flexibility or throughput?

Not surprisingly, the quality of a user interface depends on the level of technology represented in the underlying hardware. The first interactive computer systems communicated with you through teletypewriters (TTYs) — character-based terminals that could accept only typed input and could print only on paper, one character after another. As technology improved, video display terminals (VDTs) became widely available. These 'glass TTYs' could position a character anywhere on the screen, and they quickly became the norm in computing. Then came high-resolution graphical displays that could support graphical user interfaces (GUIs), complete with mice.

In the beginning was the TTY

The original interactive user interface was the command-line interface (CLI). The most familiar CLI today is probably the DOS A> prompt, but the heritage of CLIs goes further back than the IBM PC. They came by way of the TTYs that served as the first terminals for mainframes.

TTYs had a bottleneck problem: each command you typed had to be sent to the computer across a relatively slow serial link, and once the command arrived, the computer had to decode it. A typical CLI had to minimise the amount of information making its way from the TTY's keyboard to the mainframe. This is part of the reason why all CLIs have inherited a tendency towards short and cryptic commands. The only way around the bottleneck was to limit the amount of information that had to pass through it. Thus, in those early days, every keystroke counted.

TTYs were also limited in what they could print out. A TTY printed one character at a time, typewriter style. As the TTY gave way to the VDT, something new was added: the ability to alter the position of the cursor. That made it possible to print information anywhere on the screen. Using special keystrokes and a character-based VDT, software allowed you to move a cursor around the screen. You could go back and correct mistakes and update information. It's hard to grasp today what a profound improvement the electronic VDT was over the paper-based TTY.

It's even harder to grasp that the 'glass TTY' still defines the limits of CLIs, even on high-powered PCs. Although desktop computers have all but eliminated the bottleneck between the computer and the screen, character-based PCs behave as though the bottleneck still exists. CLI commands are still short and cryptic, and every single keystroke still counts. With a CLI, one wrong key can wipe out a day's work. However, CLIs remain popular because they work with almost any kind of operating-system architecture that can accept or print one character at a time. But they certainly show their age.

Fortunately, when desktop computers eliminated the CPU-to-display bottleneck, they also made graphics practical, and with them, GUIs.

The Mac standard

The Macintosh user interface was the first GUI to appear on a popular desktop computer. It became a model for almost all the GUIs to follow. By comparison to the one-character-in, one-character-out simplicity of CLIs, GUIs are immensely difficult to program. The goal, however, is to make life easier and more productive for users. Three standard features distinguish almost any Macintosh screen from a non-GUI screen: a mouse pointer, a menu bar and one or more windows (see Photo 1).

The mouse pointer, which you move around the screen by moving the Mac's one-button mouse, is typically an arrow. A program can change it to one of a number of graphical icons, however, each with its own meaning. For example, to indicate that you're supposed to wait while the computer does its work, the software will typically change the pointer to a watch.

There are several standard mouse actions: clicking selects an item or an action; double-clicking simultaneously selects an item and starts an action; and dragging moves objects on the screen or selects groups of objects.

The menu bar runs across the top of the screen. Clicking on an item on the menu bar causes the menu to drop down. Each menu item is associated with an action, which you can select by clicking on it. You can also select some menu items by using keyboard equivalents (ie, using key-based commands instead of the mouse and menu).

Other menu items pull down submenus. A submenu appears to the right of the original menu. The items on the submenu can themselves have submenus, so it's possible to work your way deeper and deeper into the command structure and see all the menus as you do. Any item, no matter how deep in the menu structure, can have a keyboard equivalent, which would make it unnecessary to go through the entire menu structure to initiate the action.

Photo 1 The Macintosh interface contains all the elements of a typical GUI. The pointer (upper left) lets you make selections and position the cursor. Menus supply you with choices among a range of actions. Windows display the output of programs

A window is a rectangle on the screen that lets you work within a program. On a Mac, you may be able to move the window around on the screen, change its size and shape, open it to fill the screen, close it entirely, or change how much of its contents shows. Windows can also contain buttons, menus, sliders and other objects.

Outside the window, there can be other icons, such as disk drive icons or a Trashcan. Just as every menu item is associated with an action, every icon is associated with an object, whether that object is a file, a program, a group of files, or a storage device such as a disk drive or a network server.

Apple has made an extraordinary effort to control the Mac GUI, with guidelines that aren't merely suggestions — they

AN AFFORDABLE COMPUTER *AT A*

BARGAIN PRICE

FOR HOME - SCHOOL - FARM - OFFICE

PC 7000 A compact portable computer

- **CPU** ● 16-bit i80C86-2 Processor
- **Memory** ● Standard 704 KB of RAM
- **Floppy Disk Drive** ● Two built-in 5 1/4" slimline floppy disk drives
- **Display** ● Tilt adjustable liquid crystal
- **Keyboard** ● Detachable, 3 angle adjustments
- **I/O Ports** ● RS 232C port, parallel port
- **Software** ● MS DOS operating system IBM PC software compatible*

*The PC 7000A runs most of the popular software written for the IBM-PC

Sharp's new PC-7000A personal computer light weight portability with industry standard software compatibility for a flexible and powerful computing system. Since the PC-7000A has been designed to be software compatible with the IBM-PC, it gives access to the largest collection of personal computer business and professional software available. Extension use of Sharp's advantaged LSI technology has resulted in an extremely compact, highly portable system design.
The PC-7000A features an advanced full-size Supertwist illuminated Crystal Display with an integrated El backlight. The image quality of the display has been greatly improved with even higher contrast than previous models for enhanced visibility and a wider view angle.
Built-in dual floppy disk drives provide IBM format program and data storage, and optional hard disk drive gives fast information access. With a standard 704KB of RAM - the PC-7000A has ample memory for processing large data bases or spread sheets.
The PC-7000A, with its extensive software compatibility and exceptional transportability, gives powerful performance at a highly competitive price - cost/ performance value that will be appreciated by any business professional.

SHARP

Simply the best in the business

DISTRIBUTED BY:

CAIRNS	070 313 144	BOWEN	077 861 282
AYR	077 833 588	MT ISA	077 433 475
TOWNSVILLE	077 754 004	INGHAM	077 763 188
MACKAY	079 512 077	BRISBANE	07 358 1111

DEALER ENQUIRIES WELCOME PH 077 763 188

MicroGram COMPUTERS

DIGITAL I/O CARD
* 48 Digital I/O lines programmable as input or output.
* 16 channels have LED status display.
* 3 independent 16 bit counters. **$135.00**

EGA CARDS
* CGA, EGA and Hercules compatible with 256kb RAM **$160.00**

EPROM WRITER CARD
* Programs 2716, 2732, 2732A, 2764, 2764A, 27128, 27128A, 27256, 27356A, 27512, 27512A.
* Read EPROMS and save to disk.
* Read from disk and write to EPROM.
* Modify EPROM.
* Blank check.

Single burner	**$190.00**
Four burner	**$360.00**
Eight burner	**$670.00**

ALSO AVAILABLE
* 8748/49/50/41/42 Writer Card **$650.00**
* Bi-polar PROM Writer Card **$585.00**
* PAL Programmer Card **$650.00**
* Universal Programmer **$1460.00**

EEMS CARDS
* Capacity 2Mb per card, 4 cards per system
* Will backfill conventional memory to 640kb.
* Comaptible with EMS and EEMS memory to run with Lotus 1-2-3, DESQview II etc.
* Driver software included as well as print buffer and RAM disk utilities. (includes LIM 4)
* XT or AT versions 0kb RAM **$230.00**

TVM MONITOR PARTS
* Fly back transformers, power supplies and circuit diagrams to suit MD3, MD300, MD7, MD700 and MD11 monitors.

BAR CODE READERS
* Selectable keyboard interface (connects between keyboard and computer) or serial interface.
* Bi-directional scanning.
* Will autodiscriminate most barcode symbologies eg.UPC/EAN/JAN/Code 39/Interleaved 2 of 5.
* Barcode printing software included. **$450.00**
* Barcode slot reader with above features. **$615.00**

"EXTERNAL" FLOPPY DRIVE CONTROLLER
* Allows two addtional floppy disk drives to be fitted (beyond A: and B:)
* Supports 360/720/1.2/1.44 on both XT and AT computers
* No need to replace existing hard disk floppy disk controller cards
* "External" drive(s) may be mounted internally with 34 pin header and ribbon cable or externally via 37 pin D connector. **$135.00**

5m PRINTER CABLE
* Standard IBM printer cable 5m long **$30.00**

TOPWARE LAN OPERATING SYSTEM
* Network up to 64 computers.
* 10Mb/sec Ethernet interface cards.
* Supports record locking with multi-user software.
* Supports file locking with single user software.
* Network software users familiar DOS commands.
* Shares all file server hard disks.
* Shares printers anywhere on the network anad allows output redirection with popup utility.
* Starter kit (Two interface cards, coax cable, connectors, software and manual). **$1100.00**

AT DIAGNOSTIC CARD
* Plug into motherboard expansion slot and switch on.
* Error code is shown on LED display indicating failure of one 59 possible tests.
* Where appropriate the manual indicates the area of circitry and / or the suspect IC associated with the error code. **$150.00**

VOICE CARD
* Digitally store a human voice on disk.
* Playback through your own programs.
* 10 Bit sampling at 16K or 32K bits/sec.
* Store approx. 1.5 hours on 20Mb Hard Disk
* Sample programs in C, Pascal, Basic and Dbase III, provided
* Microphone and speaker included. **$145.00**
* Addititional stand-alone card to play back 16 messages stored in EPROM **$149.00**

KEYPAD FOR LAPTOPS
* Provides an external cursor pad for Laptop computers.
* Plugs into 9 pin RS232C port.
* Software directs keypresses to keyboard buffer. **$160.00**

ADAPTERS AND TESTERS

* AT keyboard to PS/2 adapters	**$23.00**
* Centronics gender changer F/F	**$12.00**
* Centronics gender changer M/M	**$12.00**
* DB9/DB25 Adapter F/M	**$12.00**
* DB9 gender changer F/F	**$11.00**
* DB9 gender changer M/M	**$11.00**
* High density DB15 F/F	**$14.00**
* High density DB15 M/M	**$14.00**
* High density DB15/DB9 M/F	**$12.00**
* Null Modem DB25 M/F	**$10.00**
* Gender changer DB25 F/F	**$10.00**
* Gender changer DB25 M/M	**$10.00**
* RS232 Loopback tester DB25 M/F	**$20.00**
* RS232 Pin 2/3 reverser DB25 M/F	**$11.00**
* RS232 Surge Protector DB25 M/F	**$20.00**
* RS232 Mini wiring box DB25 M/F	**$25.00**
* RS232 Mini tester DB25 M/F	**$60.00**
* RS232/RS422 Converter DB25 M/F	**$60.00**
* RS232 to Current Loop	**$190.00**
* RS232 to RS422/485	**$190.00**
* Parallel/serial converter	**$105.00**
* Serial/parallel converter	**$105.00**

PS/2 MOUSE
* A two button mouse compatible with the IBM PS/2 computers.
* Tracking speed 500 mm/s
* Resolution 200dpi
* Includes driver software **$139.00**

BUS MOUSE
* A three button bus mouse compatible with the IBM XT/AT computers and compatibles
* Bus interface card included
* Microsoft Mouse and Mouse Systems Mouse Compatible
* Includes driver software and menu maker software **$120.00**

COMPUTER TERMINAL
* Compatible with PC Term, ANSI and DEC VT220 terminals.
* Uses standard PC monochrome monitor, and standard PC keyboard.
* Provides standard PARALLEL printer port.
* Suitable for use with Concurrent DOS, PC-MOS/386, MERGE 386, SCO XENIX, UNIX, THEOS, DEC VAX.
* Price excl, KB &Monitor **$510.00**

SOUND CARD FOR SIERRA GAMES
* Provides Stereophonic sound effects for Sierra and other compatible games **$255.00**

SOFTWARE SECURITY KEY
* Protect your spftware from unauthorized copying.
* Consists of an ASIC based hardware device.
* Hardware is fitted to a parallel port and is transparent to printers.
* Allows unlimited backups and software can run from hard-disk. **$75.00**

PARALLEL PRINTER EXTENDER
* Allows a standard parallel printer to be operated at up to 1200m from the host computer
* Users standard RJ11 connector with 6 core telephone cable
* Transfer rate 22.5kb/sec
* Kit includes transmitter, receiver and 10m cable **$165.00**

All prices include Sales Tax.

Fax: (043) 34 1334 **Phone: (043) 34 1544**

17 Barry Street, Bateau Bay NSW 2261

Dealer Enquiries Welcome

Bankcard VISA Mastercard **Packing and courier charge $8.00 Australia wide**

Photo 2 The minimise feature of Windows and PM keeps your display uncluttered while you run multiple applications. Programs running in the background are represented by their icons, rather than by an output window

have the force of law. The payoff has been that Macintosh applications all look and act very much alike — a consistency that, until the Mac, was almost non-existent in software.

However, the Mac's reputation for ease of use consists of equal parts reality and myth. While almost all Mac applications are similar, they can require extraordinary calisthenics to operate. A mouse-click is used to select and deselect items. Some software requires complex user actions, such as triple-clicking or dragging while a key is held down. And with keyboard equivalents, there are often several different ways to accomplish the same thing.

What's wrong with that? It's not consistent — and it's certainly not simple to learn. Jef Raskin, the Apple designer who originally created the Macintosh project and gave the machine its name, argued that every action should always have the same result, and that every result should have just one action associated with it. For example, there should be only one way of erasing a file.

Raskin's argument is compelling: efficiency and ease of use come from habit, and if you have one way of erasing a file, you'll become very fast at erasing files that way. The GUI designer's task, Raskin believed, was to find good, easy, efficient ways for you to perform your work. Once those ways have been developed, all software should follow them.

Needless to say, Raskin's design changed after he left the project, and the Mac you see today bears little resemblance to his original plan. The result is a plethora of ways to do almost anything on a Mac — which makes it flexible, but much more complex than its reputation implies.

Although the Mac has demonstrated in business settings that it is easier to learn than CLI-based systems, it's still a far cry from a truly easy-to-use system. This is part of the reason that, while Macintosh software was a huge improvement over the software available in 1984, it has not catapulted the Mac into spectacular success.

The Macintosh is certainly not a failure — its consistency across applications is unsurpassed, and Apple's programming guidelines produce software that rarely has trouble co-existing. (By contrast, you often find yourself playing 'TSR roulette' when you try to add yet another pop-up program to your collection of DOS utilities and drivers.) And if the Mac hasn't kept the faith of Raskin's original, friendly user-interface design, it still seems like the Holy Grail of interface design compared with DOS.

'The 'glass TTY' still defines the limits of CLIs, even on high-powered PCs.'

DOS opens a window

While the Macintosh was originally designed with a GUI, the PC was designed with CLIs. PCs get their CLI from a file called COMMAND.COM, which is actually a program that runs when no other programs are running. COMMAND.COM provides the A> prompt and executes simple built-in DOS commands such as ERASE, COPY and DIR. COMMAND.COM also loads and executes applications and batch files.

Early versions of DOS required that the original COMMAND.COM be in place, but more recent versions allow you to replace COMMAND.COM with other command interpreters, including GUIs. However, there's a fundamental problem in adding a GUI to a PC: DOS lacks many of the building blocks of a GUI, such as windowing system, mouse support, and screen drivers, to handle objects that appear, disappear, change size and move. Creating a windowing system for DOS requires building all these elements and then piling them atop DOS's command-oriented structure. The result tends to make PC-based GUIs memory-hungry and slow.

Despite the basic problems, there have been several attempts to bring windowing environments to DOS. The most notable have been GEM from Digital Research Inc (DRI), Microsoft Windows and Quarterdeck's DESQview.

GEM was originally designed as a full mouse-and-menus windowing system. It ran into legal trouble with Apple very early, and DRI had to make significant changes to GEM's desktop. Windows was another early contender that ran into trouble with Apple. Microsoft's solution was to sign a licence for some of the Apple technology.

But other problems stood in the way of the success of Windows and GEM. Users complained that both systems were slow and required too much memory. In addition, both GEM and Windows require that programs be designed explicitly for them, thus slowing their acceptance. GEM finally found a niche as the shell for Xerox's Ventura Publisher desktop publishing software. It has taken years for Windows to build a significant following.

While DESQview qualifies as a windowing system and supports a mouse, it was not designed primarily as a Mac-competitive GUI. Instead, DESQview was intended to allow several ordinary DOS programs to run simultaneously in separate on-screen windows. As a result, it became the first successful multi-tasking system for the PC, although it doesn't really fall into the GUI category.

But Windows is a GUI, and a substantial number of programs have now been designed to work with it. Like the Mac's GUI, Windows and its visually similar cousin, OS/2's Presentation Manager (PM), use a mouse pointer, a menu bar and movable windows. However, some superficial differences quickly become apparent.

For example, menus drop down immediately when the mouse points to an item on the menu bar. (Windows has drop-down menus as opposed to the Mac's pull-down menus.) The windows themselves share only some of the standard features of Mac windows: you can move a Windows or PM window by its title bar, but you can change its shape by dragging any of the other three sides.

Windows and PM also have boxes to minimise a window, allowing a program to continue running in the background and remain visible on-screen only as a small

HACKERS HEAVEN

LOW COST, QUALITY COMPONENTS

MOTHERBOARDS

8088 10MHZ motherboard (no ram) $191
80286 12MHZ motherboard, expandable to 4MB OWS ram on motherboard, SUNTAC chip set, (no ram) $330
80286 20MHZ motherboard, HARRIS CPU, expandable to 8MB on motherboard, landmark=25.6!!!, (no ram) $559
80386SX motherboard, 16MHZ P9 CPU (INTEL 80386SX), baby size, socket for 80387SX coprocessor, INTEL support chip set, zero wait state page mode interleaved memory, 1/2/4MB RAM configuration, shadow ram for BIOS, can fix I/O bus speed at 8MHZ, NORTONS SI=16.4, (NO RAM) $648
80386 20MHZ baby motherboard with INTEL 80386-20 CPU, 80287 and 80387 coprocessor sockets, 20MHZ CHIPS support chip set, 4x16 BIT + 3x8 BIT + 1x32 BIT slots, interleaved memory, 2/4/8/10/16 MB ram configurations, I/O bus speed can be fixed at 8MHZ, shadow ram for BIOS, NORTONS SI-22 (NO RAM) $1346
80386 25MHZ large motherboard with 25Ns cache ram, 25MHZ INTEL CPU, 80387/WEITECK coprocessor socket , AUSTEK 4 way cache controller, 5x16 BIT + 1x8 BIT I/O slots, 1/2/4/6/8/10/16MB ram configurations, I/O bus speed can be fixed at 8MHZ, NORTONS SI=28.8, MIPS=5.4! $1905

CHIPS

4164-10 64KBIT 100NS DRAM $3.75
4464-10 64KX4 256KBIT 100NS DRAM $5.91
41256-10 256KBIT 100NS DRAM $5.72
41256-08 256KBIT 80NS DRAM $8.26
44256-10 4X256K 1MBIT 100NS DRAM .. $ 24.00
41C1000 1MBIT 80NS DRAM $22.86
256Kx9 80NS SIMM RAM MODULE $70
1MBx9 80NS SIMM RAM MODULE $203

8087-1 COPROCESSOR 10MHz $298
8087-2 COPROCESSOR 8MHz $216
8087 COPROCESSOR 5MHz $159
80287-6 COPROCESSOR 6MHz $229
80287-8 COPROCESSOR 8MHz $362
80287-10 COPROCESSOR 10MHz $419
80387-16 COPROCESSR 16MHz $635
80387-20 COPROCESSOR 20MHz $737
80387-25 COPROCESSOR 25MHz $908
80387SX-16 COPROCESSOR 16MHz $559

V20 10MHz, faster CPU chip for XTs..... $25
INTEL 80386DX-20 CPU..... $531
INTEL 80386DX-25 CPU..... $657

PS/2, COMPAQ RAM UPGRADES

PS/2 MODEL 30 2MB ram module $566
PS/2 MODEL 50Z/55SX/70 2MB module $705
COMPAQ 286e/386 1MB ram module $363
COMPAQ 286e/386 4MB ram module $1,160
COMPAQ 386/33 2MB ram module $1,480
COMPAQ 386/386s/20e 1MB ram card..... $447
COMPAQ 386/386S/20e 4MB ram card $1,327

MEMORY CARDS

XT ram card, brings your XT up to 640Kb $64
XT CONVENTIONAL/EMS up to 2Mb $171
AT EXTENDED/EMS V3.2/4 up to 2Mb $191

I/0 CARDS

serial, parallel, clock, game, floppy I/O for XT $140
2 serial, parallel, games, clock for XT $133
2 serial, parallel, games, for AT $133
dual serial port card for XT or AT..... $76
dual serial and parallel ports for AT..... $85

PRINTERS

OKI 182P 120 cps, 9 pin, 80 column $375
OKI 320P 240 cps, 9 pin, 80 column $679
OKI 321P 240 cps, 9 pin, 132 column $908
Siemens 4100 270 cps, 24 pin, 80 column $857
Siemens 4200 270 cps, 24 pin, 132 column .$1130
Siemens 4400C 450cps, 24pin, 132col, color $1816

Siemens 200cps, 80 col, INK JET printer $1250
Siemens 200cps, 132 col, INK JET printer $1378

Siemens PT10 (HP LASERJET SERIES II 8PPM LASER printer) $3397
RIBBONS AND LASER CARTRIDGES ..... CALL

FLOPPY DISK DRIVES

TEAC 360KB 5.25" $121
TEAC 1.2MB 5.25" $140
TEAC 720KB 3.5" including 5.25" frame $152
TEAC 1.44MB 3.5" including 5.25" frame $159
EXTERNAL floppy drive case, including data and power cables $76
external PS/2 1.2MB 5.25" floppy drive, case, controller, software, cables, manual, etc $438

HARD DISK DRIVES

20MB 62mS 4hdsx615cyls Half/Height $349
NEC 3142 40MB 28mS 8hdsx642cyls H/H $667
QUANTUM 42MB 12mS 5hdsx965cyls including 16 bit controller with 64KB diskcache ram ... $908
PRIAM 71MB 28mS 7hdsx1170cyls H/H $1067
QUANTUM 84MB 12mS 10hdsx965cyls incl AT controller with 64KB diskcache ram $1391
Conner Peripherals 100MB 25mS drive and AT controller (also includes dual FDC) $1400

PRIAM 158MB ESDI 18mS F/H..... $2451
SIEMENS 322MB ESDI 16mS F/H $2985

QUANTUM 40MB SCSI 19mSH/H $819
QUANTUM 80MB SCSI 19mS H/H $1435
QUANTUM 105MB SCSI 19mS H/H $1537
SIEMENS 322MB SCSI 16mS F/H $3112

PLUS HARDCARD 80MB 19mS, discache... $1390

HARD DISKS FOR MACINTOSH..... PLS CALL

DISK DRIVE CONTROLLERS

(WD=WESTERN DIGITAL)
XT/AT QUAD FDC 360K/1.2M/720K/1.44M, 2internal + 2 external or 4 internal, cables ... $108
WD GEN or DTC 5150 XT MFM DUAL HDC .. $89
WD 27X or DTC5160 XT RLL DUAL HDC $114
WD1003MM2 AT dual FDC + dual 2:1 HDC .. $197
WD1006MM2 AT dual FDC + dual 1:1 HDC .. $241
WD1007SE2 Dual ESDI HDC + dual FDC $426
16 bit SCSI controller kit for 6 SCSI drives and 4 floppies, incl cables for internal FDDs & HDD, and drivers for DOS/XENIX/NOVELL $483

TAPE BACKUP SYSTEMS

ARCHIVE 40Mb internal kit, uses XT/AT fdc .. $671
ARCHIVE 80Mb internal kit, uses AT fdc..... $838
ARCHIVE VIPER 60Mb complete internal kit $1299
ARCHIVE VIPER 150Mb internal kit $1579
ARCHIVE VIPER 60Mb external kit $1774
ARCHIVE VIPER 150Mb external kit $2431
ARCHIVE VIPER VP402 controller card $168
ARCHIVE 60 Mb SCSI tape drive $1132
ARCHIVE 150Mb SCSI tape drive $1299
SYTOS backup software $82

DC2000 CASSETTE for XT/AT backup drives.. $49
DC600A 60Mb tape cartridge $56
DC6150 150Mb tape cartridge..... $77

MONITORS

14" green dual scan on tilt/swivel base $216
14" EVEREX EGA (640x480, .31mm pitch) $629
14" NEC multisync 2A (800x560, .31mm) $737
14" EVEREX multisync (1024x768, .28mm) $768
14" NEC multisync 3D (1024x768, .28mm) .. $1048
16" NEC multisync 4D (1024x768, .28mm) .. $2140
20" NEC Multisync 5D (1280x1024 .31mm) $3620

VIDEO CARDS

quality monographics + printerport $95
colour graphics + printer port $89
EVEREX EGA (640x480) + printer port $217
EVEREX 16 bit VGA (1024x768, 16clrs) 512K $461
VIDEO7 8 bit VEGA VGA (800x600) 256K ... $391
V7 1024i 16 bit VGA (1024x768, 16clrs) 512K $608
V7 VRAM, 16 BIT, 512K (1024x768), very fast $971

PC BITS AND PIECES

baby flip top case with 150W supply $191
baby flip top case with 200W supply $210
slide case chassis with 200W supply $235
mini tower case with 200W supply $267
floor tower case (holds 6 drives) 200W supply $381

150 watt supply for standard IBM XT case $114
220 watt supply for standard IBMAT case $159
150 WATT power supply for baby case $114
200 WATT power supply for baby case $133

84 key BTC keyboard $89
102 key BTC keyboard $108

gender changer; M-M OR F-F $6
2 way serial data switch $38
4 way serial data switch $51
4 way parallel data switch $51

GMf302 hi res (up to 1050 DPI) genius serial mouse, S/W , accessories, for XT, AT, PS/2... $115
LOGITECH series 9 serial mouse, for XT, AT, or PS/2 with software $203
MICROSOFT series 400 bus or serial mouse with paintbrush and mouse menus $254

GS-4500 400DPI, 105mm SCANNER with scanning, drawing, and accurate OCR software, controller card, great for text and graphics $412

IBM parallel printer cable 1.8 Metres long $11
IBM parallel printer cable 3 metres long $19
IBM parallel printer cable 5 metres long $30
serial cable, M-M or M-F, DB9 or DB25 ..... $19
CABLES: IEEE 488, SCSI, ATARI, VGA monitor, keyboard extension, video extension, gender changers, breakout boxes, null modems, male-male centronics cable, etc ,etc..... PLS CALL

multi purpose TESTER/BURNER for Eproms, PALs,bipolar proms,8748,8751,TTL,dram etc .$927

NOTE: ***HACKERS HEAVEN IS ALSO OPEN ON SATURDAY MORNINGS!*** All prices include sales tax, errors and ommissions excepted, freight extra. Using BANKCARD, MASTERCARD, or VISA to pay for phone or mail order?....Please supply name, address, phone, card number & expiry date, and signature if by mail.

SHOP 5, NORTH SYDNEY OVAL, MILLER ST, NORTH SYDNEY,NSW
P.O. BOX 748, ARTARMON, NSW, 2064
PHONE (02) 956 6883

OUT OF DISK SPACE?

Eventually every computer user will run out of disk space. They can upgrade by either installing a new drive (if there is space to mount the new drive) or increase the capacity of their existing disk by approximately 90% using cost effective and easy to install Perstor ADRT Hard Disk Controller from Perstor Systems INC.

Perstor ADRT Controller Features:

Increases Hard Disk Storage Capacity by 90%
Writes Data to Disk within design specification
56 bit Error Checking and Correction (ECC)
ST506/412 Standard Interface
9 Megabit/sec Data Transfer Rate
Compatible with MFM and RLL drives
16 bit version Compatible with Novell 2.1+and
SCO Xenix 2.2+

Sample Capacity Increase:

	MFM Capacity	ADRT Capacity
Miniscribe		
Ms3650	**40Mb**	**78Mb**
Ms6085	**71Mb**	**130Mb**
Maxtor		
XT1085	**71Mb**	**130Mb**
XT1140	**110Mb**	**240Mb**
NEC		
D5146h	**42Mb**	**78Mb**

Money Back Guarantee

All enquiries to Bitwise Systems Pty Ltd (incorporated in NSW)
1/28 Lilian Fowler Place. Marrickville NSW 2204
Ph: (02) 516 5244 Fax: (02) 516 5755

icon (see Photo 2). That feature — part of their support for multi-tasking — is their most recognisable advantage over the standard Macintosh GUI.

But something else sets Windows and PM apart: they are designed to conform to IBM's Systems Application Architecture. SAA is part of IBM's plan to bring a level of standardisation to some of its operating systems, from mainframes to PCs. The fundamental idea is to design an architecture in which the same software can be used on a terminal connected to a mainframe, a workstation connected to a minicomputer, and a desktop microcomputer — with only minimal changes to support the wide range of hardware involved.

That task is difficult, because the lowest common denominator, character-based terminals, does not support graphical displays or mice. To allow software to run on both terminals and PCs with GUIs, SAA mandates that every menu item or mouse-based action in an SAA-compliant system must have a keyboard equivalent.

As a result, there will be a certain level of consistency across all SAA applications. Function key F1, for example, is always the help key under SAA (a stand-

GUI comparison

GUI	Macintosh	Windows	PM	Open Look	Motif
Operating system	Macintosh	MS-DOS	OS/2	Unix	Unix
Multi-tasking	No	Yes	Yes	Yes	Yes
Networking GUI	No	No	No	Yes	Yes
File manager	Internal	Internal	Internal	Internal	External
Consistency across applications	Very good	Good	Good	Not available	Not available
Graphics performance	Good	Good	Good	Slow	Slow
Menu style	Pull-down	Drop-down	Drop-down	Pushpin	Drop-down
CLI available	No	Yes	Yes	Yes	Yes
Underlying standards	Macintosh	SAA	SAA	XWindow	SAA, X Window
Software base	Large	Moderate	Small	Non-existent	Non-existent
Available	Yes	Yes	Yes	No	No

Table 1 These five leading GUIs show their strengths in different areas. The Macintosh is highly consistent across applications; Windows and PM offer SAA compatibility and multi-tasking; and Open Look and Motif operate through networks but tend to be slow.

Sick monitor? Don't despair!

Monitor Repair Service from Thomas Electronics

If your monitor is on the blink, you needn't worry, getting it working again is as easy as giving us a call. So, if you have one of the more popular brands, we can return your monitor--good as new--in five working days in most cases.

We take just about any type of monitor. In fact, we repair computer and video monitors for the major names in the industry.

We'll pick-up and deliver in the Sydney and Melbourne metropolitan area. For customers with a regular service requirement, we offer fixed price repairs. All our work carries a 90 day warranty.

So, if you're having problems with your monitor give us a call NOW.

We specialise in IBM* JX and PS/2 monitors.

THOMAS ELECTRONICS OF AUSTRALIA PTY. LTD.
Head Office: 12 Larkin Street
Riverwood N.S.W. 2210
Phone: (02) 53 0721 Fax: (02) 534 2171
Victoria Phone: (03) 460 7344
Fax: (03) 460 7833

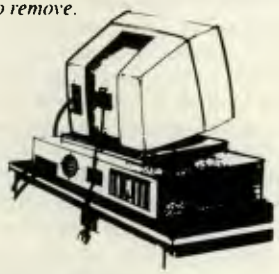
*IBM, JX and PS/2 are trademarks of IBM Australia Ltd. TEA104

DETERS THEFT OF PORTABLE VALUABLES

LINK 'N' LOCK

Simply, Link 'n' Lock consists of a plastic coated, one metre long high tensile cable which is threaded through special plates attached to your valuables and to a secure anchor point such as a desk. At one end of the cable there is a metal lug and at the other a metal lug with an eye through which you secure the padlock supplied. The plates have a peel off back which reveals a revolutionary new adhesive face which once applied requires a force of more than 200Kg to remove.

No tools are required, so installing LINK 'N' LOCK is simply easy.



SECURE

- Computers
- Typewriters
- Printers
- Videos
- Stereos
- Microwaves
- Toolboxes

LINK 'N' LOCK AVAILABLE FROM:

QLD: Cairns Security Supplies P.O. Box 5090 G.P.O. Cairns QLD 4870
NSW: F & E. Printing (02) 70 3882, P.P.S. (02) 231 5210 Word Express (02) 290 3100 or439 8966, Maintain Axis Computers (Newcastle) (049) 52 4900, Word Express (Newcastle) (049) 46 9100

S.A.: Freeway Electrical Wholesalers (08) 371 1966
VIC: Sujon Computer Services (03) 299 2100
WA: D & G Pty Ltd (09) 332 6270 Aust-Guard Security Service (09) 375 1722

FOR A.B. SECURITY PTY LTD
P.O. Box 355, ARTARMON, NSW 2064, AUSTRALIA
P.O. Box 31-276, AUCKLAND 9, NEW ZEALAND

Photo 3 The Open Look pushpin menus let you position a menu wherever you like on the screen

ard that has been picked up by many non-Windows and non-PM applications). And most Windows applications, for example, generally function like other Windows applications.

However, Microsoft's style guidelines are not nearly as rigorously enforced as Apple's. Given the PC's history of incompatibilities, it's hard to believe that Windows and PM will ever achieve the level of consistency of Mac software.

Windows and PM offer some advantages over the Mac, however, including the ability to minimise a window, but neither Windows nor PM offers a GUI that is as smooth or attractive as the Mac's, or as consistent. Also, Windows and PM, with their mandatory keyboard equivalents, stray even further than the Mac from the principles of ease of use. Ultimately, even more than the Mac does, Windows and PM may suffer from programmers who would rather substitute a windowing system for careful, friendly program design.

X marks the spot

Unix poses its own problems for GUIs. Like DOS, Unix was designed as a character-oriented system; any graphical elements must be built on top of the original system. But Unix has another problem: unlike DOS or OS/2 systems, in which the display is closely tied to the CPU, a Unix system can have a display terminal that's far from the central computer. It's the bottleneck problem all over again: how can you send large amounts of graphical information through a conventional communications link?

The commonly accepted solution is MIT's X Window System (referred to as X Window for the remainder of this article). X Window is a standard way of describing graphically oriented displays and sending the information from one X Window system to another. X Window also provides the ability to send keystrokes and mouse-movement information, so you can interact fully with the program. X Window doesn't completely solve the bottleneck problem, but it's a great improvement over sending a GUI display to a terminal one pixel at a time.

However, X Window is not a GUI. You might say it's just a graphical communications interface. Several X Window-based GUIs have been built (including proprietary systems, such as DECwindows, which runs only on DEC computers), but the two X Window-based Unix GUIs that promise to become the most widespread are Unix International's Open Look and the Open Software Foundation's (OSF) Motif.

Open Look was designed by Sun in close association with AT&T. In fact, it was originally designed to be the GUI for the new version of Unix (System V Release 4), which is scheduled to appear this year. However, Open Look has both technical and political peculiarities. It can use some of the X Window System, but it also depends heavily on Sun's own operating-system features.

One of the reasons for a hybrid approach was X Window's notorious slowness in updating some screens. This slowness is more than a minor annoyance. It's the most obvious characteristic of many X Window implementations. Users complain that they can move a mouse and wait seconds before the on-screen mouse pointer moves. However, a new version of X Window was recently released, and it's said to be much more responsive.

Another reason may have been Sun's long investment in its own non-X Window GUIs. The Sun alliance with AT&T was directly responsible for the creation of Open Look's main competitor, Motif, which is fully X Window-based.

As you'd expect, Open Look resembles the Mac and PC windowing systems. The usual windows and mouse pointer are there and, as with Windows and PM, a window can be reduced to an icon while its program continues to run.

But Open Look has some different features as well. You can move a copy of a menu around on-screen, for example, or hold it in position with a pushpin (see Photo 3). Even more significant is Open Look's mouse. It has three buttons, each of which has a specific purpose. The left button is for selecting items from menus; the middle button is for moving and resizing windows; and the right button is for pulling up so-called invisible windows and menus, which appear separately from any menu bar.

Open Look's unusual use of the mouse is both its greatest weakness and its greatest strength. If you're accustomed to using other GUIs, the three-button approach is unfamiliar. But it's also much more consistent — a particular mouse button always serves the same function. As a result, although the learning curve is somewhat steeper, some users say Open Look is ultimately much more efficient than other GUIs.

OSF/Motif has its own political and technical history. OSF was formed by several Sun competitors who feared that Sun's close relationship with AT&T would produce a version of Unix that would be especially well suited to Sun's workstations — giving Sun a head start in getting products to market. OSF's first project was a competition to design an X Window-based GUI that would compete with Open Look. The result was Motif (see Photo 4) — a blend of the look of Hewlett-Packard's NewWave, the feel and behaviour of OS/2's PM, and the toolkit from DEC's DECwindows system.

Motif looks similar to Windows or PM, except that it has the characteristic three-dimensional look of NewWave. It works very much like the PC-oriented GUIs and has the ability to minimise a window. However, Motif doesn't come with its own file manager — the portion of the GUI that actually allows you to copy and delete files. Some current implementations of Motif (including The Santa Cruz Operation's Open Desktop) use IXI's X.desktop as the file manager. However, X.desktop can be jarring to some users, since it and Motif don't share the same visual style.

Both Open Look and Motif have extensive specifications for conforming to a standard style, but it's too soon to tell whether either system will approach the Mac's consistency across applications. In fact, both GUIs have just been introduced, although several different software vendors have demonstrated their products using early versions of the interfaces. At the moment, Open Look seems almost ready to go. Meanwhile, Motif, with its conventional use of X Window and the

640K Before Headroom®

640K After Headroom®

If you're up to your gills in TSRs (RAM resident programs), you've undoubtedly found out they can be quite a drain on your system's 640K.

Unless of course, you already know about Headroom.®

Simply put, Headroom breaks the 640K barrier by letting you run all your memory-resident programs from extended or expanded memory, or from hard disk. This means there'll always be enough room for even the most RAM ravenous "fish" to swim around in.

With Headroom you can hot-key between up to 32 application programs – so you can switch from your word-processor to your database to your spreadsheet with a touch of a key! But unlike other swapping and switching "merry-go-round" programs, all your TSRs are *always fully functional!*

Headroom is so fantastic that PC Magazine said *"Headroom performs more death-defying escapes from DOS's 640K straightjacket than any other program."*

And that's no fish story!

Features:	HEAD ROOM	Software Carousel	Pop Drop Plus
Switch between programs	32	12	None
Menu of loaded programs	✔		
Easy on-screen setup	✔		
Includes cut and paste utility	✔		
Controls TSRs	32	12	50
Resolves TSR conflicts	✔		✔
Frees all RAM occupied by TSRs	✔		
TSRs remain fully functional	✔		✔
TSRs operate with each other	✔		
Load/unload TSRs as you go, in any order	✔		
Control/Free RAM used by device drvrs.	✔		
Use extnd. or expnd. memory or hard disk	✔	✔	

- Relocates memory resident programs to extended or expanded memory or hard disk
- Frees *all* RAM occupied by memory residents
- Works with any memory resident program of any size
- Controls mainframe emulators, fax programs and device drivers
- Helps TSRs pop up in Windows™ and other graphics environments
- Helps TSRs operate with newer hardware (e.g. mouse, VGA, PS/2, etc.)
- Hot-key between 32 programs, even Windows™
- Works under all network environments
- Removable without rebooting
- Uses only 50K

System requirements: IBM PC/XT/AT or PS/2 or compatible, ANY expanded or extended memory (not required), hard disk, MDA, CGA, EGA, Super VGA, MCGA, Hercules™ or compatible display system.

(Voice) 02-387 5316 (Fax) 02-387 6420

$195 + $5 per order Shipping

MASTERCARD/BANKCARD

DATAMATE

P.O. BOX 431 KENSINGTON 2033

©1989 Helix Software Co., Inc. Headroom, IBM, Hercules, Software Carousel, Pop Drop Plus, Windows, and other mentioned names are registered trademarks of their respective corporations.

HELP FOR ALL PROGRAMMERS

Don't reinvent the wheel. You can create sophisticated applications FAST with our 4GLs, Database, Windowing, Comms and Graphics Libraries etc. Over 1,000 products available including the following:

	$
Database Management	
Faircom c-tree/r-tree	967
Novell Btrieve	369
Machine Independent CQL for c-tree/btrieve	590
Ocelot2 - The SQL! (DB2/SQL Clone)	*NEW* 229
Raima db_VISTA III	1250
Unix Compatible Tools	
CodeCheck by Abraxas	869
PC Yacc Professional by Abraxas	738
PC-Lint by Gimpel	245
dBASE and Clipper Support	
Artful Lib for Clipper	345
Clear Plus for dBASE	325
Concentric R&R Relational Report Writer for dBASE	280
Desktop Ai dBX dBASE to C Translator	*SPECIAL* 699
HJS dBUG for dBASE	295
Sequiter Code Base 4	469
Editors	
Magma ME C-like Macro Editor	175
MKS vi Programmer's Editor	270
Solutions Systems Brief	319
Communications	
Blaise C Asynch Manager	260
Greenleaf Comms	458
4GLs and Application Generators	
Clarion Professional Developer Ver 2010	939
Faircom d-tree	752
Matrix Layout Version 2.0	*NEW* 320
ProC with Workbench	*SPECIAL* 495
Softcode with C or dBASE Template	159
General Function Libraries	
Blaise C Tools Plus	199
Blaise Power Tools Plus 5.0	251
Blaise Turbo C Tools	289
Greenleaf Business Mathlib	615
Greenleaf Functions	365
Graphics	
Media Cybernetcis HALO	565
Pinnacle dGE 3.0	315
Windows	
Greenleaf Data Windows	615
Oakland C-scape with Look and Feel	72..
Solutions Systems C Worthy with Forms	485
Vermont Creative Views	660
General	
Clear Plus for C	325
Gimpel c-terp	465
Glockenspiel C + + with Commonview	935
Haventree Easyflow	250
Pocketsoft .RTLink	329
Powerline Source Print	180
Powerline Tree Diagrammer	140
V Comm Sourcer with BIOS Preprocessor	295
Zortech C + + Compiler 2.0	342
Zortech C Video Course	599

Phone or write for more information and a ***FREE*** *subscription to "The Programmer's Bulletin."*

NOBLE

SYSTEMS Pty. Ltd.

601 Botany Road Rosebery 2018
Phone: (02) 698-9272 or (02) 214-2853
Fax: (02) 698-8785 BBS: (02) 560-3607

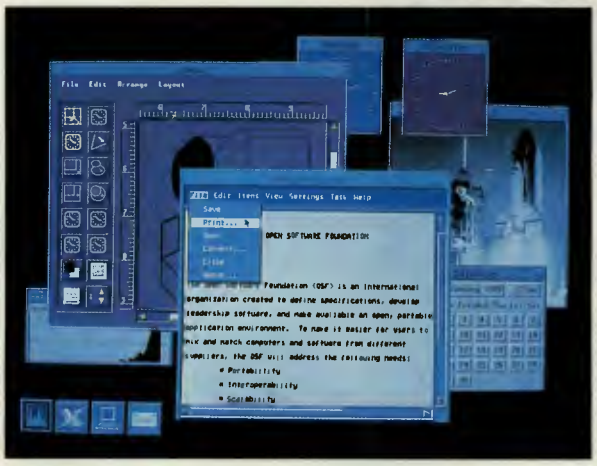


Photo 4 Motif features a distinctive three-dimensional look, while conforming to the X Window System and IBM's SAA interface standard

mouse, seems to be a more familiar and popular choice, but it isn't yet ready for users.

With either system, it may be a while before much Unix software makes the jump from a character-based interface to a GUI. However, it does have some things going for it. For example, the more powerful workstations that traditionally run Unix have useful advantages over PCs or Macs. On a Macintosh screen, dragging a window is indicated by a dotted outline; in Motif and Open Look, the entire window moves. But the complexity of X Window and the remaining communications bottleneck will continue to keep it substantially slower than its non-Unix competitors. Still, for communicating across networks with a GUI, X Window is far ahead of its competition (see the Table 1).

Coming attractions

If GUIs present a far more complex architecture than CLIs, will the next generation bring still more complexity to programmers in the search for easier-to-use software? Probably not. The most innovative systems for desktop computers today are racing towards object-oriented programming.

Apple's MultiFinder, a multi-tasking operating system for the Macintosh, replaces conventional time-sliced preemptive multi-tasking with event-oriented, co-operative multi-tasking. This is a step in the direction of the SmallTalk environment that gave birth to modern GUIs. NeXT's NextStep provides tools designed explicitly to speed up programming. NewWave and applications such as ViewLink and Magellan move much of what was once programming into the hands of users.

Meanwhile, hardware is no longer a critical barrier for better user interfaces. While low-speed TTYs once forced you to deal with CLIs, today fibre optics and inexpensive video technology are making an entirely new set of views possible for your desktop windows. In the Knowledge Navigator, the imaginary future computer that Apple president John Sculley likes to describe to his audiences, an animated talking head answers your questions.

In the real world, however, video images are already part of some GUI systems. The images are what might be called semi-interactive video: you can't change the contents of the video, but you can control how to view the images — in what order and at what speed. The combined GUI/video interface even has a name: the video user interface or VUI.

One use of semi-interactive video, as part of Japan's TRON project, is in software designed for education and running on a modified PC. In one demonstration, you can watch a short video image of the African grassland and then click with a mouse on various animals or plants within the picture to see close-ups, extract information or run a related video. The video images are stored on a video disk but appear within windows on the computer screen.

Another use of video in a windowed user interface is in networking, particularly in groupware. Researchers at the Xerox Palo Alto Research Center — home of the first GUIs — have experimented with continuous remote video conferencing between the PARC and a facility near Portland, Oregon. With improving video (and networking) technology, the approach could eventually put the faces of every member of your workgroup on your screen — along with a project, document or spreadsheet the group is working on.

The VUI is an important step in the evolution of user interfaces for desktop computers. Just as the move from CLIs to GUIs made working with a computer less abstract and more 'real', VUIs hold the promise of combining graphical, video and audio information to bring the real world into the computer.

END

WIN!

VALUE $995

A V32 9600 BPS SUPER EXECUTIVE MODEM

If you purchase a Maestro Modem, your name goes into a barrel.
(Conditions apply)
PERMIT NO. TC issued under Lotteries and Art Unions Act, 1901.

FREE

COMMUNICATIONS SOFTWARE

Including Viatel Package ($2.50 for postage)

2400 DATA OPTIMIZER - MNP Level 5 Modem

Includes Error Correction and Data Compression

V.22 - V.22 bis - **MNP** Mode 5 data compression with Hayes compatibility, auto dial, auto answer, auto disconnect with error checking. This modem is capable of quadrupling the data flow with MNP Mode 5. Depending on the file you can reach a staggering 9600 bps peak compression - error free!

Astounding Value!! **$399** (incl tax)

Model 2400XR

$299.00 Incl. Tax

Telecom Approved

Features - *Automatic Everything* and

- Hayes 2400 "AT" command set compatible
- 27 "S" registers • Extensive self-testing
- Non volatile RAM • Call progress monitoring
- Uses the latest technology DSP chip-set
- Asynchronous / synchronous

V.22, V.22bis Bell 103, 212, 2400

Money Back Guarantee If Not Completely Satisfied Within 14 Days

The Amazing ... 2400ZXR $399.00

Telecom Approved **Retail Incl. Tax**

Uses the Latest Technology D.S.P. Chip-set with Performance Equal to or Better than Modems Costing ***$1600.00*** or **More!**

Automatic Everything ... Auto-Answer, Auto-Dial, Call Progress Monitoring, Pulse / Tone Dialling, Line Condition Monitoring, Hayes Compatible.
V.21, V.22, V.22bis, V.23 (300/300, 1200/75, 75/1200, 1200/1200, 2400/2400)
V.23 with automatic bit rate converter

NEW 1234 V PLUS In MODEM $349.00

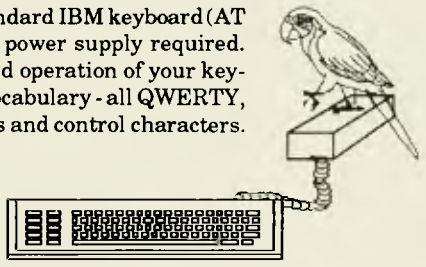
All the features of the 2400ZXR in a PC CARD MODEM

KEY TALK is HERE!!

Now Available in Kit Form

The ULTIMATE feed-back device for your keyboard.

SPECIFICATIONS: Requires a standard IBM keyboard (AT or XT) or compatible. No external power supply required. Does not interfere with the standard operation of your keyboard or slow it down in any way. Vocabulary - all QWERTY, ASCII characters plus function keys and control characters. Audio level adjustable.



$69.00 Incl Tax

1200 Bit Stream Flyer

$199.00

- Manual dial • Manual answer
- V.22, Bell 212

Undoubtedly the cheapest 1200/1200 bps V.22 modem in Australia

9600 BPS

$995 Incl Tax (Avail 1/ '90)

V.32 Super Executive

V.32 **9600 FULL DUPLEX** **on a standard telephone line**

V.32 - V.21 - V.22 - V.23 - V.22 bis ...
The absolute latest in technology. Uses an awe inspiring three **digital signal microprocessors.** Hayes compatible, auto dial, auto answer,

MAESTRO Pty Ltd

Calool Street, South Kincumber 2256

Phone Your Order NOW (043) 68 2277 Fax (043) 68 2731 Credit Cards Accepted

Chatswood
23 Oscar St. NSW 2067 Tel: 02-4132873 02-413 2874 Fax: 02-413 4604

Kingsford
Shop 1, 277 Anzac Pde. NSW 2032 (NEW STORE opening in April)

Kogarah
55 Regent St. NSW 2217 Tel: 02-5879469 Fax: 02-5879930

Wollongong
17 Bovard Court. NSW 2530 Tel:042-616331 Fax: 042-612799

HARDWARE

OKI Printers

ML172	$365
ML183	$525
ML320	$675
ML321	$875
ML380	$690
ML390	$880
ML391	$1150

Panasonic Printers

KXP1180	$385
KXP1191	$475
KXP1124	$585
KXP1540	$1150
KXP4450	$3690

Other Printers

NEC P5200	$890
NEC P5300	$1295
Star NX1000	$420
Star NX1000CL	$500

NEC Monitors

MultiSync 2A	$750
MultiSync 3D	$975
MultiSync 4D	$2350
MultiSync 5D	$3990

Tape Backups

Colorado 60Mb Int	$660
Colorado 60Mb Ext	$890
Archive 60Mb Int	$1050
Archive 60Mb Ext	$1190

Modems

Netcomm Auto 123	$450
Netcomm Auto 1234	$550
Netcomm 2400 SA	$680
Netcomm 1234 SA	$760

Maths Co-Processors

8087-2	$240
80287-8	$390
80287-10	$420
80387-SX	$650
80387-20	$790
80387-25	$1050

Video Cards

VGA (800 x 600)	$265
VEGA	$465
VEGA VRAM	$1099
VEGA FASTWRITE	$695
TSENG Lab	$550

General

Microsoft Mouse	$220
Logitech Mouse	$180
Logitech Scanman	$495
Mouse with Dr Halo	$95
Scanner 400dpi (With OCR Software)	$450

Prices Include Sales Tax and are subject to change without notice.

Software

MS Excel	$595	Paradox 3.0	$785
MS Word V5.0	$460	Pal-Edit Std	$220
MS Works	$220	Pal-Edit Pro	$350
MS Project V2	$495	Turbo Pascal V5.5	$180
MS Windows 286	$140	Turbo Pascal Pro	$325
MS Windows 386	$250	Turbo C V2.0	$180
MS Fortran	$675	Turbo C Prof	$325
MS COBOL	$1290	Turbo Basic	$140
MS Macro Asm	$205	Turbo Prolog	$190
Quick Basic	$140	Sidekick Plus	$240
Quick C	$140	Quattro Pro	$620
Wordperfect V5.0	$550	Sprint	$255
Attache 4	$Call	Multimate V4.0	$620
Lotus V3.0	$Call	Applause II	$750
Lotus Freelance	$670	Q&A	$420
Lotus Manuscript	$670	MACE Gold	$220
Lotus Agenda	$520	Desqview	$165
Norton Adv Util V4.5	$155	Desqview 386	$240
Norton Comm	$195	Qemm 386	$100
Harvard Graphics	$540	PC Tools Deluxe	$160
Harvard Proj Mgr II	$765	Xtree	$65
First Choice V3.0	$195	Xtree Pro	$130
First Graphics	$180	Xtree Gold	$155
First Publisher	$159	Xtree Net	$410

Please call for prices on items not listed.

TP Premier 286-10
1Mb Ram, 1.2Mb FDD, 20Mb HDD, Small Footprint Case, Ser/Par/Games ports, VGA Monitor and Card
$2390

TP Premier 286-16
1Mb Ram, 1.2Mb FDD, 40Mb v/c HDD, Small Footprint Case, VGA Monitor and Card
$2950

TP Premier 386-SX
1Mb Ram, 1.2Mb FDD, 40Mb v/c HDD, Small Footprint Case, VGA Monitor and Card
$3350

TP Premier 386-20
1Mb Ram, 1.2Mb FDD, 40Mb v/c HDD, Small Footprint Case, VGA Monitor and Card
$3990

TP Premier 386-25C
4Mb Ram, 1.2Mb FDD, 71Mb v/c HDD, Tower Case, VGA Monitor and Card
$6190

TP Premier 386-33C
4Mb RAM, 1.2Mb FDD, 71Mb v/c HDD, Tower Case, VGA Monitor and Card
$7200

Wearnes Boldline M Series
The computer with the future built-in.
Designed by *ALR*.
It can be upgraded to a 386 or 486 in seconds by simply changing the plug-in CPU board.
No more worry about obsolescence.
Fully configured system with 40Mb Hard Disk and VGA Monitor.

$2988

Behind the scenes

A good API makes development a piece of cake. And a bad one, says Howard Eglowstein, can drive you insane.

Providing a user interface that you can learn to use quickly and easily has been a driving force in the computer industry since the Macintosh made 'ease of use' a religion in 1984. The major interfaces — DOS and Unix command interpreters, Macintosh Finder, Windows, Presentation Manager and the X Window System — provide different levels of functionality and comprehensibility.

Deciding which user interface to support in a multiple-machine environment requires more than a simple examination of the different interfaces. It requires an understanding of the programming interface that underlies what you see on your computer screen.

The application programming interface is what gives your program access to the system's resources. A good API will make it easy to concentrate on the task at hand, and a bad one can drive you bananas.

The API lets your program communicate with the operating system, which is responsible for managing all the resources available in the system. At a minimum, this involves managing the keyboard, display, disk drives and file system. Most personal computers extend operating-system support to include the management of printer ports, serial I/O ports and memory.

Giving all programs unrestricted access to all system resources would result in chaos. The operating system needs to be in control to sort out conflicting requests for scarce resources. You need a way to tell the operating system what your program needs to do, and that's what the API is for.

A bushel of APIs

At the simplest level, the API is just the definition of the raw operating-system calls. CP/M or DOS programmers who work in assembly language use such calls exclusively.

At the next level, a high-level language like Basic, C or Pascal incorporates operating-system calls into its own language primitives and standard libraries, making it easier to use the operating system and providing some level of code portability. The high-level-language approach also radically reduces learning time; the language designers have programmed the hardest routines for you.

Perhaps the most interesting API is an event-driven windowing environment. From the outside, a windowing program normally has menu bars and movable windows and uses some sort of pointing device to control a free-roaming cursor. These elements constitute a graphical user interface (GUI). Microsoft Windows and the Mac interface are the most common examples.

A windowing interface combines basic operating-system calls with special libraries that control the graphics display, pointing device, memory allocation and (if it is supported) multi-tasking. A high-level language normally ties it all together. However, unlike conventional text-based applications, the event-driven mode of a windowing interface takes control of all user input.

The GUI checks the keyboard and pointing devices and determines which key press or mouse 3click is meant for which program. Along with any timer or other interrupts, these input events are placed in a special event queue, which the API controls. Instead of checking the input devices, an application asks the API for any relevant events and processes input by dispatching control to the appropriate event handler. Applications that are programmed with an event-driven API have a distinctive look and feel that many people find easier to learn and use. GUIs also provide a more intuitive way of handling a multi-tasking environment.

Inside the command line

DOS and CP/M share a common lineage and thus have similar APIs. In both programming environments, a set of common

entry points is set aside for standard operating-system functions. In CP/M (which supports only a 64K program area), the memory at 0005 hexadecimal points to the jump table, which contains the address of each of the operating-system functions in a specific order. DOS reserves several of the 808x processor's software-interrupt vectors for accessing the operating system.

With both systems, you access an operating-system function by first placing any necessary addresses or data in the appropriate CPU registers and calling the correct interrupt (DOS) or CALL 0005 (CP/M). The operating system takes control, completes the operation and returns to your program. Your program finds returned data or status information in CPU registers or designated memory buffers.

Both DOS and CP/M function calls are limited to keyboard input, simple screen output, and disk and file system calls. DOS also provides some control over the division of system memory up to 640K. Running DOS on an IBM-compatible machine lets you access the system BIOS as well, enabling you to control the serial and printer ports, graphics screen, and system clock without doing any low-level programming.

APIs speak your language

If assembly programming isn't to your liking, you can program CP/M and DOS machines in a high-level language. Basic and C are probably the most commonly used high-level languages. They completely shield you from having to manipulate CPU registers directly.

Listing 1 shows an assembly DOS program opening a disk file. Listing 2 contains the same function, written in C. The C compiler handles all the DOS functions and remaps them into a standard ANSI C format. Basic performs a similar function, except that the standard Basic implementation on DOS machines is Microsoft's GW-Basic, which is not an ANSI standard. Listing 3 shows how you open a file using GW-Basic.

In these sample listings, note that the file name is designated using the DOS naming conventions. While high-level languages give you some degree of code portability, the operating system always determines the file-naming convention.

Screen control in DOS is not nearly as flexible as file access. DOS uses the system BIOS to give you simple teletypewriter emulation. By outputting characters to a standard file handle, DOS can pass them through the BIOS to the screen. This handle does not support cursor commands, colours or any display attributes — just characters. (CP/M implementations at least provided some form of terminal emulation, normally with VT52 or similar escape sequences.) However, an IBM-compatible machine gives you control over display attributes, such as cursor location and text colours, through calls to the system BIOS.

In assembly language, you create screen attributes using the INT 10h BIOS interrupt and access the display-file handle through the INT 21h DOS interrupt. GW-Basic provides its own interface to the BIOS. Sadly, standard C libraries provide only the teletypewriter emulation of DOS — C does not support BIOS calls. To correct that omission, most compilers can be fitted with function libraries that give you full control over the screen. In some cases, these libraries come with the compiler. They are also available from numerous third-party developers.

```
Fname   db  'FACE.DMG',0
Fhandle dw  ?
;
        mov DX,offset Fname  ; DX register points to the filename
        mov AX,3D00h         ; AH=the 'open' function (3Dh)
                             ; AL=file mode is open for read (00h)
        int 21h              ; Software interrupt 21h is the
                             ; standard MS-DOS file system interrupt.
        jc  Open_error       ; When DOS returns, check the Carry bit to see
                             ; if the operation was successful. If it didn't
                             ; work, jump to our error-handling routine.
        mov Fhandle,AX       ; Since we didn't jump, it must have worked.
                             ; DOS returned the file "handle" in AX.  Save it.
; Go on and do more stuff
```

Listing 1 Programming DOS in assembly language involves manipulating the registers directly and triggering specific interrupts. This code fragment opens a file

```
#include <stdio.h>           /* Standard DOS information, stored in an include
                                file. */
char name[] = "FACE.DMG";    /* The file we want opened. */

FILE *fp, *fopen();          /* Open the file, store the 'handle' in fp. */

  if ((fp = fopen(name,"r") != NULL)) {
                             /* If we failed, fp = NULL. Punt. */
       /* Do some stuff with the file. */
       fclose(fp);           /* Close the file. */
       }
  else {
       /* We couldn't open the file. */
       }
```

Listing 2 This piece of code demonstrates how to open a DOS file using C. The high-level language shields you from the complexities of the assembly API

```
10 ON ERROR GOTO 200   : ' If the OPEN doesn't work.
20 ' When the file is opened, it will be accessed as channel 1.
30 ' BASIC "channels" are analogous to MS-DOS "handles."
40 OPEN "FACE.DMG" FOR INPUT AS #1
50 ' If FACE.DMG couldn't be opened, we would have jumped
60 ' to line 200.
70 PRINT "File is opened"
80 CLOSE#1
90 STOP
200 ' Error-handling routine.
```

Listing 3 Opening the same file from another high-level language, GW-Basic. The same method works under Microsoft QuickBASIC and Basic 7.0

DOS and don'ts

DOS is essentially a group of device-control functions waiting to be called by your application program. Writing for DOS is simply a matter of working in the standard definition of a language, making the appropriate function calls as needed. This limits your program to the functions that DOS defines. (It also limits your programs to a maximum of 640K of memory.)

Thus, DOS programs tend to be very keyboard-oriented and often appear sparse. Perhaps the most common complaint from DOS users is the lack of a standard user interface. Because DOS handles only basic screen output or keyboard entry, your program is free to use any keystrokes. You can also make the screen look any way you please. However, if you choose to use the DOS API, you should strive to be consistent.

The non-standard standard

Unix has been around much longer than DOS, but it wasn't a practical operating system for desktop equipment until the arrival of fast processors, cheap memory and high-capacity hard disk drives. Unix is semi-portable, and it has been adapted to many different processors and architectures. In the world of Unix, however, there's no such thing as standard hardware, never mind a standard machine-instruction set. If you're going to work with Unix, you have to stay with C or some other high-level language.

C programs written for Unix, like those written for DOS, are based on the standard ANSI C definition. Each Unix manufacturer provides a specific flavour of C compiler designed to generate code compatible with its hardware. All you have to do is write standard C, compile it on your machine and you're set. File I/O works through `fopen()` — even the keyboard, since C maps all keyboard input to the `stdin` file pointer.

In theory, any program you write for a DOS machine should compile directly under Unix. There are exceptions, so you can't expect to have portable code if you use direct memory pointers or make assumptions about internal data formats.

The Unix difference

Unix systems usually have more memory than DOS machines — *lots* more. Unix system libraries have built-in support for terminal control and true multi-tasking.

Pre-emptive multi-tasking can make programming a complex system much easier on a Unix machine than it is on a DOS machine. For example, say you're writing the ultimate word processing package and you want it to run under both DOS and Unix. One feature you want to add is background printing, where the software can print one file while editing another.

DOS provides two ways to accomplish this, neither of them terribly elegant. Because a word processor spends most of its time waiting for keystrokes, you can perform limited multi-tasking within the code by writing a keyboard-sampling routine that prints out a few characters, samples the keyboard and then prints a few more characters. Since your program polls the keyboard at regular intervals, this approach works well for a word processor. It is not appropriate for most programs, however.

Another facility available under DOS is the background 'multiplex' interrupt, which will perform simple background tasks as a part of DOS's overhead. A standard DOS utility, PRINT, uses this interrupt to handle file printing in the background. A number of DOS word processing packages send output to a temporary file and then have DOS use PRINT to output the file. Elegant? No, but it is functional.

On a true multi-tasking operating system such as Unix, you can spawn a separate task to handle printing. In fact, this task could be a separate copy of the same word processor. The spawned task handles the printing as needed and then destroys itself. The operating system handles task switching and resource conflicts automatically, making the code much simpler.

Terminal affairs

Screen I/O under Unix isn't much better than it is under DOS. When Unix was developed, bit-mapped graphics screens were an oddity. Until the advent of the microcomputer, all output screens were part of data terminals, some of which featured better functionality than others.

Unix handles a terminal by treating it like a file and using standard file I/O commands to spit characters back and forth. Simply sending ASCII characters wouldn't give you any cursor control, and it's impractical to write support for every possible terminal type into your program. (This is not a problem under DOS, however, because all PCs look alike to DOS.)

To avoid this problem, Unix systems provide you with a standard terminal-interface package. A terminal is assumed to support a standard set of functions, driven by escape sequences. A table of all possible terminals is stored in the Termcap file, and the system variable TERM will tell your program which kind of terminal it's on. It's not nearly as convenient as the single DOS machine type, but it's a good compromise and is one step towards a device-independent interface.

A sashay through the Windows

Imagine adding one layer of graphics support between you and the operating system. Further, give this layer complete control over the system memory, keyboard and file system. Then, have the graphics support offer a wide variety of window types and support any type of screen (within reason). What you wind up with is an API that supports a GUI.

Apple calls its GUI API the Toolbox and puts it into the system ROM of every Macintosh it makes. DOS users can buy something similar (in the guise of Windows/286 or Windows/386). Those running OS/2 have access to similar technology with Presentation Manager. In the following discussion, I use Mac terminology. Bear in mind, however, that Windows, PM and the Macintosh are similar and work in much the same way.

In an event-driven environment, the

Attention Clipper /dBase Developers -Clipper/dBase Libraries

General Purpose	
FUNCky	310.00
Proclip 3.5	245.00
Tom Rettig's Library	179.00
Artful Lib	325.00
IDL	295.00
Get-it	255.00
Graphics	
dGE	295.00
Flipper IV	295.00
Silverpaint	179.00
Networking	
NetLib	390.00
Communications	
Silvercomm	289.00
Silvercomm C Interface	179.00
AdComm	395.00
HP Laserjet	
Escape	169.00
Compilers	
Clipper - S87 Free upgrade to 5.0	750.00
Force	995.00
dBFast/PLUS	520.00
Productivity Tools	
Alink	295.00
Blinker (New Dynamic Linker)	349.00
dBug	295.00
Pre/DB	169.00
Sez-You	105.00
Dclip	325.00
Overlay()	140.00
Brief/dBrief	395.00
Fast Text Search	179.00
Tom Rettig's Help	199.00
Tom Rettig's Maker	295.00
Clear+ for dBase	295.00
Code Generators/Report Writers	
U12	750.00
Scrimage	230.00
R&R Relation Report Writer	230.00
R&R Clipper/Fox module	110.00
R&R Code Generator	230.00
Genifer	625.00
Books	
Clipper Programmers Guide	65.00
dBase Language Handbook	69.00
Salvaging Damaged dBase Files	65.00
C Libraries/dbf Tools	
Code Base 4	459.00
Silvercomm C Asynch Lib	375.00
Clear+ for C	295.00
Overlay() for C	140.00

RCM Software
51 Through Rd Burwood 3125
Tel (03) 809 2041
Fax (03) 889 0263

FREE ON SITE WARRANTY!

When you buy a Computer from George's Computer Store, You are winning all the way. Big Range of Epson and Dakomm Computers. The Best Deals, Friendly Expert Service and from the 1st of March, Free 12 Months On Site Warranty through 3M. *(Laptop models excluded).* All Metropolitan Areas, Capital Cities a total of 19 Locations, all over Australia.

Australia wide through 3M Australia Pty. Ltd.

Portable Deal of the Decade!

Epson PC Portable

Epson PC Portable with full size Keyboard and number pad, 3.5" 720k FDD, 20MB Hard disk, Back-lit removable LCD Screen and connection for optional external colour monitor. Complete with carrying case. Battery mains, 100-250 volts.

With First Choice, Laplink and Epson LX-400 printer.

Limited Quantity at $2595

NEW 40MB EPSON AX PORTABLE!

New 40MB version of the popular AX 286 12MHz portable. This computer has the best paper white LCD Screen. Full size Keyboard with Numberpad, 1.44MB floppy disk drive. Battery mains operation with Laplink and carrying case.

under $4000

NEW EPSON AX2e

New Epson, faster 286 12MHz computer. 1MB of RAM expandable to 5MB on the Motherboard. With Voice coil Hard disks, built-in 1:1 controller, Microsoft Mouse, MS-DOS 4.01.

40MB Mono RRP $4105
40MB EGA RRP $4645
40MB VGA RRP $5495

100 MB Voice coil Hard disk extra..

RRP $1250

NEW EPSON AX3s

New Epson, 386-SX computer in the same small footprint case as the AX2e. 1MB of RAM expandable to 5MB on the Motherboard. With Voice coil Hard disks, built-in 1:1 controller, Microsoft Mouse, MS-DOS 4.01.

40MB Mono RRP $4485
40MB EGA RRP $5025
40MB VGA RRP $5875

100 MB Voice Coil Hard disk extra..

RRP $1250

Epson Desktop Computer Deal of the Decade!

Epson PCe 20MB and Epson AX2 20MB and 40MB Computers now come with the following extras:
PFS First Choice, Integrated Software package,
Microsoft Mouse - Microsoft Flight Simulator
Point & Shoot Menu system and an Epson Printer!

Prices Start from under $2500

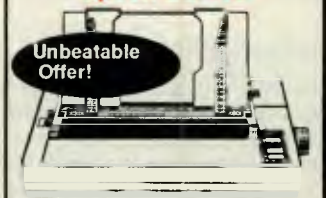
We stock the full range of EPSON Printers from the smallest to the super fast DFX-5000 twin paper path 500cps printer. We also stock the full range of ORIGINAL Epson Ribbons, Inkcartridges and Toner cartridges in fact all Epson Consumables.

New EPSON AX3/25

Epson AX3/25 is a 25MHz 386 cache computer 2MB of RAM (expandable to 16mb), 1.44MB FDD, 3X8 bit and 6x16 bit expansion slots, 101 Deluxe Keyboard, MS-DOS 3.3. Very fast 100MB Voice coil Hard disk.

Mono RRP $8695
EGA RRP $9265
VGA RRP $9990

Epson LQ-400



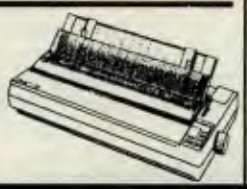
Epson LQ-400 80 column 24 pin printer with tractor and sheet feeder, free printer cable and paper.

Special under $540

FREE PARKING!

At ESP Parking Station 144-148 Elizabeth Street, Just a few doors away. We validate your ticket for up 2 hours when you shop with us. Monday to Friday only.

New Epson Printer LQ-1010!



Latest from Epson. 136 column, 24 pin printer with Paper Parking with Free Printer cable & paper. Too good to miss. Ideal for Spreadsheets.

under $1000

EPSON GQ-5000

New Laser printer from Epson with Scalable Fonts,

Special at $2750

2MB version including Font Library for 92 additional Fonts.

Special at $3395

Dakomm Pty. Ltd trading as

George's Computer Store

154 ELIZABETH ST. SYDNEY 2000 Fax 264 7852 (Near Goulburn St. Parking Station) Ph: (02) 264 9188

FREE ON SITE WARRANTY!

When you buy a Computer from George's Computer Store, You are winning all the way. Big Range of Epson and Dakomm Computers. Best of Deals, Friendly Expert Service and from the 1st of March, Free 12 Months On Site Warranty through 3M. *(Laptop models excluded)*. All Metropolitan Areas, Capital Cities a total of 19 Locations, all over Australia.

Australia wide through 3M Australia Pty. Ltd.

Dakomm Slim XT

Dakomm Slim-line 12 MHz computer with 1MB of RAM, 360K Floppy disk Drive, 20MB Hard disk, 101 Keyboard, graphic card, Monitor, MS-DOS 3.3

Mono RRP $1850
EGA RRP $2495
VGA RRP $2595

DAKOMM Slim 286

Dakomm 12MHz 286 computer, 15.6 MHz performance. 1MB of RAM (expandable to 4MB on the m/board), 1.2MB Floppy disk drive, 42MB VOICE COIL Hard disk, 101 Keyboard and Monitor, MS.DOS 3.3.

Mono RRP $2395
EGA RRP $2995
VGA RRP $3095

Dakomm Desktop 386-SX

Latest 386 SX Motherboard in a small footprint case. Landmark performance excess of 20MHz. With 1MB of RAM (expandable to 8MB), 1.2MB 5.25" floppy disk drive, serial and parallel ports. with 42MB Voice coil Hard disk, 101 Keyboard, graphic card and Monitor, MS-DOS 4.01

Mono RRP $2825
EGA RRP $3450
VGA RRP $3550

Dakomm Mini-Tower 386-SX

Latest 386 SX Motherboard is a unique combination of the popular 16 bit bus and the true MULTITASKING 386 SX chip. Rated 16MHz it has landmark performance excess of 20MHz. With 2MB of RAM (expandable to 8MB), 1.2MB 5.25" & 1.44MB 3.5" floppy disk drives, serial and parallel ports. with **42MB Voice coil** Hard disk, 101 Keyboard, graphic card and Monitor, MS-DOS 4.01

Mono RRP $3295
EGA RRP $3925
VGA RRP $4025

100MB Voice coil Hard disk extra
RRP $825.00

Dakomm Mini-Tower 386

This is a real flyer. We have fitted in the same Mini-Tower a full size 386 25MHz computer (Landmark performance 32MHz), 2MB of RAM, 5.25" 1.2MB and 3.5" 1.44MB Floppy disk drives. Serial and Parallel ports, Deluxe 101 Keyboard. 1:1 cache controller, 42MB Voice coil Hard disk, graphic card & Monitor, MS-DOS 4.01.

42MB Mono RRP $4150
42MB EGA RRP $4750
42MB VGA RRP $4875

100MB Voice coil Hard disk extra
$825.00

Recommended Retail Prices on this page are for your guidance only.
Fax us your requirements. Our Prompt QUOTATION Service will delight you.

Dakomm Full Tower 386 Cache Computers

33 MHz 386
25MHz 386

The Grand Daddy of them All. This is a True 33/25 MHz Computer with Intel 82385 Cache Controller. 4MB of RAM 1.2MB & 1.44MB Floppy Disk Drives, 1:1 Interleave Disk Controller, 101 Keyboard, graphic card and Monitor. Landmark:
33 Cache= 59MHz
25 Cache = 42MHz

33MHz Cache Computer with 42MB V/coil Hard disk.

Mono RRP $7,695
EGA RRP $8,325
VGA RRP $8,450

25MHz Cache Computer with 42MB V/coil Hard disk.

Mono RRP $5450
EGA RRP $6095
VGA RRP $6195

100MB V/coil Hard disk extra
RRP $825

380MB ESDI Hard disk available at a Special Price.

Dakomm Notebook Computer

NEW LOW PRICE
20MB Hard Disk Model

$3095
Save $300

Weighing just 3.2Kgs, measuring 30.5x22.5x6cm this tiny computer has full size keyboard and 10" Back-lit LCD Screen. Fast 80C86 CPU, 1MB of RAM, 640KB system and 384 EMS. 2 serial 1 parallel ports, mouse port, RGB (Monitor port, external FDD port. Removable NicCad battery with mains charger. MS-DOS 3.3.

Dakomm GTL-16M with 1.44MB floppy disk drive
New Low Price RRP $1995

Dakomm GTL-16HB with 20MB built-in Hard disk
New Low Price RRP $3095

External 1.44MB or 1.2MB Floppy disk drive
RRP

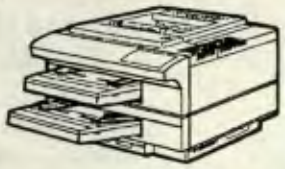
MAY CLEARANCE SALE!

We are having a B-I-G and Genuine Clearance Sale of Discontinued Models, Samples and some Traded-in equipment. You can Save Hundreds even Thousands of Dollars on Fully Guaranteed Computers.

There are 10MHz XT Computers with 20MB Hard disk for only $1000
There are Flying Workhorses (now discontinued) 286, 386-SX and 25MHz 386 models. All Drastically Reduced.

LIMITED QUANTITIES ONLY HURRY OR YOU'LL MISS OUT.

NEW GENERATION CANON LASER PRINTERS!



We stock the full range of Canon Laser Printers up to the twin bin LBPIIIR. All have amazing Scalable fonts and many other advanced features. Full range of Software drivers available for your favourite programs.

from under $3000

Dakomm Pty. Ltd trading as

George's Computer Store

154 ELIZABETH ST. SYDNEY 2000 Fax: 264 7852(Near Go ulburn St. Parking Station) Ph: (02) 264 9188

SANCOM COMPUTERS

Affordable Excellence

SANCOM lineup of HIGH QUALITY HIGH PERFORMANCE PCs

HIGH RESOLUTION
VGA COLOR GRAPHIC
HIGH SPEED
VOICE COIL HARD DISK

SANCOM	Landmark Speed	RAM Size	42M Hard Disk	105M Hard Disk
386 - 25	34 MHz	2 M	$ 4290	$ 5040
386 - SX	25 MHz	1 M	$ 3530	$ 4280
286 - AT	16 MHz	1 M	$ 2950	$ 3700

All Systems include

1.2 M Floppy Drive Parallel Serial Ports Real time clock 101 keys enhanced keyboard
High resolution 16 bits VGA card 800 x 600 14" COLOR VGA Monitor on Swivel & tilt base
Fast 25/28 mSec 1/1 interleave Voice Coil Hard Disk with 32K Cache
Microsoft MS DOS 4.01 with GW-Basic
Microsoft Works - *Spreadsheet, Word processor, Database & Communication software*
Mouse - *3 buttons MS & Mouse System Mouse compatible with Case, Pad & software drivers*
12 months SANCOM WARRANTY

Introducing SANCOM Specialist SOFTWARE CENTRE

at 1st Floor 76 Paramatta Road Annandale Tel 02 - 550 2455

- **SANCOM 286-AT 42M V/C Hard Disk VGA/Color Monitor** **Normally $5050**
  Ventura Publisher plus Pro extension and NOVA training video **While stock lasts $ 4200**
- **ATTACHE 4 & 5 Accounting Package with professional accountant installation, training & support**

Real estate - Building construction - Publishing - Video - Accounting - Sign making

SHOWROOMS & SALES OFFICES (Mon-Fri 9:30am to 5pm Sat 9:30am to 12 noon)

No. 76	Paramatta Road	ANNANDALE	Tel: 550 2455
Shop F12	Level 1. Wallaceway Center, Endeavour Street	CHATSWOOD	Tel: 413 2929
Suite 1	10 Woodville Street	HURSTVILLE	Tel: 579 3377
Shop 15	The Mall. 313 Macquarie Street	LIVERPOOL	Tel: 602 9088
Shop 146	313 Harris Street	PYRMONT	Tel: 552 1640
No. 1380	Logan Road.	MOUNT GRAVATT, BRISBANE	Tel: 07 - 343 2844

SERVICE CENTRE & HEAD OFFICE 43 COSGROVE ROAD ENFIELD N.S.W. 2136

Tel: 02 - 742 5188 **Dealer enquiries welcome SALES 742 5455** **Fax: 02 - 642 0228**

All Prices include SALES TAX Prices & Specification subject to change without notice

operating system automatically samples the keyboard, mouse, serial ports and other sources of input. The windowing software directs input events into the proper window's queue. The software then calls the program that controls the window.

When notified of an event, your program looks at the event type and dispatches a routine to handle it. Normally, this event handling takes the form of a **case** statement in C or Pascal.

Your program would normally provide routines to handle keystrokes, mouse movements, serial I/O (if you're using the serial ports), button clicks and disk insertions. In addition, the windowing software informs your programs when its window is covered up by other windows, when it's uncovered and when it should be closed.

Listing 4 is a Pascal program (Excellent.P) for the Macintosh that displays a window and waits until you select Quit from the System menu. Most of the meat has been removed to make the structure visible.

GetNextEvent returns the next event in the queue. The **case** statement isolates **MouseDown** and **KeyDown** events, calls the necessary routines, and then loops until **doneFlag** is set. In a complete program, **doneFlag** is set by clicking the close box, selecting **Quit** from the System menu or some other action. **SystemClick** passes a **MouseDown** event off to activate desk accessories.

Microsoft Windows uses a similar scheme. Listing 5 is an excerpt from SHOBITS, a program in C that displays arbitrary graphics on the screen and wraps text around them. **WinMain** is the main procedure that displays the graphics window and polls for messages from the event queue. Note the structural similarity between the Windows program and the Macintosh program. In this example, **GetMessage** serves the same purpose as the Macintosh's **GetNextEvent**.

```
{This source is for MPW Pascal}
Program  Excellent;
{Program name:  Excellent.P}
{Function:  This is the main module for this program.}
{History: 1/2/90. Original by Prototyper.}

   repeat                              {Start of main event loop}
     if (theInput <> nil) then         {See if a TE is active}
        TEIdle(theInput);              {Blink the cursor if everything is OK}
     SystemTask;                       {For support of desk accessories}

     if GetNextEvent(everyEvent, myEvent) then
                                       {If event then...}
        begin                          {Start handling the event}
           code := FindWindow(myEvent.where, whichWindow);
                                       {Get which window the event happened in}

           case myEvent.what of        {Decide type of event}
              MouseDown :              {Mouse button pressed}
                 begin                 {Handle the pressed button}
                    if (code = inMenuBar) then
                                       {See if a menu selection}
                        begin          {Get the menu selection and handle it}
                           {Do the menu-handling stuff here}
                        end;           {End of inMenuBar}

                    if (code = InDrag) then
                                       {See if in a window drag area}
                        begin
                           {Do the window dragging stuff here}
                        end;           {End of InDrag}

                    if ((code = inGrow) and (whichWindow <> nil)) then
                                       {In a grow area of the window}
                        begin
                           {Window growing stuff}
                        end;           {End of doing the growing}

                    SystemClick(myEvent, whichWindow)
                                       {Let other programs jump in}
                 end;                  {End of MouseDown}

              KeyDown,AutoKey:         {Handle key inputs}
                 begin                 {Get the key and handle it}
                    {Get the key, and dispatch to any routines}
                 end;                  {End for KeyDown,AutoKey}

              UpDateEvt :              {Update event for a window}
                 begin                 {Handle the update}
                    whichWindow := WindowPtr(myEvent.message);
                                       {Get the window that the update is for}
                    BeginUpdate(whichWindow);
                                       {Set the clipping to the update area}
                    EndUpdate(whichWindow);
                                       {Return to normal clipping area}
                 end;                  {End of UpDateEvt}
           end;                        {End of case}
     end;                              {end of GetNextEvent}
   until doneFlag;                     {End of the event loop}
end.                                   {End of the program}
```

Listing 4 A sample Macintosh event loop. Most of the code has been removed to better show the file structure

Share and share alike

Windowing systems are often multi-tasking, so it's possible that other programs will be vying for the same resources. Thus, the windowing system normally manages memory, as well as screen I/O, which requires special calls to send text to the active window. Keystrokes come in through the event queue. File I/O, on the other hand, is usually handled directly by the operating system.

Multi-tasking is handled in various ways. Non pre-emptive systems, such as the Macintosh, use co-operative multi-tasking, which takes advantage of the fact that programs have to query the system for events. By asking for an event, the program indicates to the event handler that it is waiting for something to do. Another program can then take control of the processor for a while and return control when it is waiting for an event.

If all the programs on such a system are well behaved, then everyone gets a turn. Of course, there are always a few programs that don't play fair and never relinquish control. On the Macintosh or under Windows, there simply is no way for an application to regain control from these ill-behaved ones.

On the other hand, OS/2 is truly a pre-emptive operating system and PM can simply take control whenever it wants. Whether you have a pre-emptive or non pre-emptive environment, it's best to make sure your applications can co-exist with other programs in a multi-tasking system.

A standard standard

Widowing interfaces depend on high-resolution graphics displays. In this regard, the Mac Toolbox enjoys the advantage of always running on a Macintosh. There are no problems with non-standard displays. The Toolbox can run any program on any type of display that conforms to Apple's standard. In fact, you can have your program ask the Toolbox about the colour and resolution of the display and use this information in your program. Device independence on the Macintosh is excellent.

The PC, however, has few standards, and life with Windows becomes interesting because of it. Microsoft has built-in support for the usual screen displays: CGA, EGA and VGA. Because of the

```
/* The Source file:  shobits.c  */
#include "windows.h"
#include "shobits.h"            /* There's no bits like SHOBITS */

int PASCAL WinMain( hInstance, hPrevInstance, lpszCmdLine, cmdShow )
{
    msg.wParam = 0;

    if ( hPrevInstance ) {
        /* Copy data from previous instance */
        }
    else {
        /* Call initialization procedure - this is the first instance. */
        }

    if (hWnd = CreateWindow((LPSTR)szAppName,
                            (LPSTR)szMessage,
                             WS_TILEDWINDOW,
                             0,    /*  x - ignored for tiled windows */
                             0,    /*  y - ignored for tiled windows */
                             0,    /* cx - ignored for tiled windows */
                             0,    /* cy - ignored for tiled windows */
                             (HWND)NULL,        /* no parent */
                             (HMENU)NULL,       /* use class menu */
                             (HANDLE)hInstance, /* handle to window instance */
                             (LPSTR)NULL ) ) {  /* no parameters to pass on */

        hInst = hInstance;          /* Save instance handle for DialogBox. */

        while ( GetMessage( (LPMSG)&msg, NULL, 0, 0) ) {
                                    /* Polling messages from event queue. */
           TranslateMessage( (LPMSG)&msg );
           DispatchMessage( (LPMSG)&msg );
           }
    }
    return (int)msg.wParam;
}

}
/* Procedures that make up the window class. */
long FAR PASCAL ShoBitsWndProc( hWnd, message, wParam, lParam )
   switch (message)
      {
      case WM_SYSCOMMAND:
          switch (wParam)
              {
              case IDSABOUT:
                  DialogBox( hInst, MAKEINTRESOURCE(ABOUTBOX), hWnd,lpprocAbout );
                  break;
              default:
                  return DefWindowProc( hWnd, message, wParam, lParam );
              }
          break;
      case WM_DESTROY:              /* Quit was selected from the File menu */
          PostQuitMessage( 0 );
          break;
      case WM_MOUSEMOVE:            /* Any time the mouse moves */
          if (bMouseDown) {
              /* Erase old line and draw a new one */
              }
          break;
      case WM_LBUTTONDOWN:          /* If either mouse button is pressed */
      case WM_RBUTTONDOWN:
          if (!bMouseDown) {
              /* snag a starting X and Y coord */
              }
          break;
      case WM_LBUTTONUP:
      case WM_RBUTTONUP:
          if (bMouseDown) {
              /* The button was down and has just been released */
              }
          break;
      case WM_PAINT:          /* Windows has just asked us to repaint the screen */
          BeginPaint( hWnd, (LPPAINTSTRUCT)&ps );
          if ( PlsAddTxt ) {        /* Wrap two columns of text */
              Column1 ( hWnd, GetDC( hWnd ) );
              Column2 ( hWnd, GetDC( hWnd ) );
              }
           PlsAddTxt = FALSE;
           ReadClipboard ( hWnd, GetDC( hWnd ) );
           XorBox ( hWnd, startx, starty, endx, endy );
           EndPaint( hWnd, (LPPAINTSTRUCT)&ps );
           break;
      default:                      /* Any message we don't have a handler for */
           return DefWindowProc( hWnd, message, wParam, lParam );
           break;
    }
    return(0L);
}
```

Listing 5 A main procedure and event loop from Microsoft Windows

popularity of the monochrome Hercules graphics board, recent versions of Windows now support that card as well. But that's about it. If you want to use one of the new full-page displays with Windows, you will have to make sure that the manufacturer supplies a Windows driver. PM is limited to standard Windows devices.

Cooking up an application

APIs are not all sweetness and light. Those who work with Windows or the Macintosh probably consider the DOS API half-baked. Conversely, the eyes of those involved with DOS tend to glaze over when they first investigate Windows. However, the recipe for picking the right API is an easy one.

If you work on the Macintosh, you have no choice. The standard Mac operating system is programmed solely through the Toolbox and event-loop programming. A/UX, the Unix port for the Mac II family, combines the multi-tasking of Unix with the best of the Toolbox functions.

The X Window System is a standard that is beginning to show up on Unix workstations. However, the GUIs built on top of it are not yet generally available on desktop machines and are incompatible with one another. Until the X Window System-based GUIs make greater inroads into the desktop arena, Unix hackers will have to be content with their true multi-tasking and Termcap screen control.

If you work on an IBM-compatible machine, you have a few options. Programming conventional DOS applications is easy, and the new crop of DOS extenders allows access to memory beyond the standard 640K. You can choose between two GUI environments: Windows running under DOS and PM running under OS/2. All three of these APIs have appeal.

If your applications rely heavily on multi-tasking, OS/2 is probably the correct choice. However, it may be a long time before OS/2 becomes the standard operating system for IBM compatibles, if it ever does.

If you need to be able to port your application to other machines, straight C under DOS or Unix would be a good choice. If ease of use is a primary concern, then Windows may well be your best choice.

Examining user interfaces is only part of the picture in determining which system to support. Understanding the strengths and weaknesses of each API and matching the right API to the job at hand will make your efforts much more fruitful.

END

Introducing AGI Computers

AGI stands for Advanced Group Innovations. We have been building personal computers since 1986 as an OEM group of Everex. To date we have shipped 500,000 of them to earn the reputation of producing solid, reliable products. The continually increasing demand from the retail channel had necessitated a spin-off of the OEM group into a full-fledged Everex subsidiary with a unique brand-name; AGI... Advanced Group Innovations Computers, the name resellers and distributors implicitly count on.
Call us today for further information.

AGI Model	AGI 1700A	AGI 1700C	AGI 3000G	AGI 3000D	AGI 3000L	AGI 3000K	AGI Laptop
CPU	286/10	286/12	386SX/16	386/20	386/25	386/33	286/12
Desktop/ Tower	Desktop	Desktop	Desktop	Desktop	Desktop/ Tower	Desktop/ Tower	Laptop
Landmark	10	15.7	18	25.4	40	53.3	15.3
MIPS	1.6	2.5	2.8	3.64	5.9	7.94	2.41

AGI is a trademark of AGI Computers, Inc., AGI Computers Inc. is a registered trademark of Advanced Group Innovations. Everex is a trademark of Everex Systems Inc. All specifications are subject to change without notice. AGI adlv.1 10/89

AGI Computer, Inc.
Advanced Group Innovations
A Subsidiary of Everex Systems, Inc.

MULTISOURCE
Sole Australian Distributor for AGI Computer, Inc.

Phone: (02) 899-1899 FAX: (02) 680-3103
Unit 3, Six Gladstone Road
Castle Hill NSW 2154

Dealer Inquiries Welcome

C C DATA COMPUTERS

Shop 214, 80 Dixon Street, CHINATOWN, SYDNEY. Ph: (02) 281 7766 FAX: (02) 281 5122

(May Specials, All Prices Including Sales Tax.)

5.25"	**DSDD**	**360K**	**Floppy Diskettes**	**$0.50ea.**
5.25"	**DSHD**	**1.2M**	**Floppy Diskettes**	**$1.20ea.**

(Minimum Order: 50 off, Unitl Sold.)

3.50"	**DSDD**	**720K**	**Floppy Diskettes**	**$1.50ea.**
3.50"	**DSHD**	**1.44M**	**Floppy Diskettes**	**$3.50ea.**

(Minimum Order: 10 off, Until Sold.)

IBM COMPATIBLE COMPUTER SYSTEMS

Land Mark Speed Test	XT 10MHz	286AT 16MHz	286-20 27MHz	386-33 56MHz
Mother Board 0k RAM	**$120**	**$ 300**	**$ 800**	**$2,500**
Basic Computer System: 1 FDD, 1 Serial, 1parallel ports HGA Card, Case + 101 Keyboard	**$700**	**$1,300**	**$1,800**	**$3,500**
Basic System with 20Mb H/D + HGA Card and Mono Monitor	**$1,500**	**$2,000**	**$2,500**	**$4,200**
Basic System with 40Mb H/D + EGA Card and EGA Monitor	**$2,100**	**$2,600**	**$3,000**	**$4,700**
Basic System with 40Mb H/D + VGA Card and VGA Monitor	**$2,400**	**$2,900**	**$3,300**	**$5,000**

ADD-ON CARDS

VGA Card	**$250**
EGA Card	**$150**
CGA or HGA Cards	**$ 60**
HDD Controller (XT)	**$100**
HDD & FDD Controller	**$180**
Serial Card	**$ 50**

MONITORS

14"VGA	**$750**
14"EGA	**$700**
14"CGA	**$550**
14"Mono	**$200**

PRINTERS

6ppm Laser	**$3,000**
9pin 80 col.	**$ 300**
24pin 80 col.	**$ 700**

Short-term efficiency, long-term productivity

Trudy Neuhaus investigates the relative merits of high-level languages and database languages.

For all of you who read TJ's Workshop mainly for the database tips, this column has been created just for you. Devoting a column strictly to databases allows us to take an in-depth look at applications and add-ins that space and format previously prohibited.

Yet apps and add-ins do not a column make — at least not in TJ's Workshop. We will also investigate current database issues and ways to make you more efficient when working with databases. But to do this requires something else. Feedback. I need to hear from you: what products you want to explore, what topics you want to tackle and what problems you need to solve. I'm especially interested in hearing about useful tricks and techniques you've learned or uncovered. From time to time I will publish the best of what our readers have to offer in these pages. But everyone's contribution will affect the editorial course this column pursues.

While tips and techniques make you more productive at a local level, they can go only so far. If you have written a useful utility in MASM, for example, that can be linked to dBASE, this is the place for you to be heard. Likewise, we will also be exploring more global issues such as which language is best to use. For example, both Clipper and FoxPro have provided enhancements to their languages that make them incompatible with dBASE. Which should you choose? When should you switch? Stay tuned: this is one topic we will visit in depth in upcoming issues.

Another important topic is choosing between high-level languages (HLL) and the database languages — which is our focus in this issue and in the next several columns.

My goal in this column is twofold. First, I want to give you a handle on short-term increases in productivity through tips and techniques. And second, but perhaps more important, I am also keenly interested in covering the subjects necessary to long-term, long-range productivity improvements.

Database vs high-level languages

With the relatively recent introduction of HLL database libraries, such as Borland's Paradox Engine (see First Looks), it's fast becoming easier and easier to create complex database applications using HLLs either in place of, or in combination with, dBASE-type languages. So in this issue I'll tackle the question that always arises whenever we're given an alternative: which is better? Using the dBASE language and C as examples, let's take a look at some of the pros and cons of using each.

dBASE for the novice

If you're a novice programmer, you should seriously consider using dBASE. It's one of the best 'first' languages for beginners, mainly because it encourages structured programming. Its modularity and relatively simple yet powerful structure make it easier to write clean code quickly. As you would expect, dBASE also has more built-in database capabilities — features generally lacking in C and other HLLs. But perhaps most important to a beginner are its memory-handling capabilities and interpreted language; as we'll see next, they are constructed so that you won't experience a serious crash of dBASE on your computer, and you can always return to the dot prompt no matter how bad your errors are.

Memory handling

C and other HLLs have the capability of accessing and then writing over any part of memory. dBASE, on the other hand, addresses only the memory variables it creates. By managing its applications' memory variables, dBASE provides a big layer of protection between the program and the objects the program addresses. In addition, there are no pointers in dBASE as there are in C: one variable cannot hold the address of another variable where the address is used to access the latter variable. So the mistakes of a novice are apt to be minor.

Like everything else, however, being once more removed from memory has its advantages and disadvantages. While it's generally safer to program using dBASE and its clones, this also means you have little or no control over the overhead used by the DBMS, whether memory or disk space. A good example of this is the end-user support: while the user interface of dBASE and its clones is a very attractive feature, it consumes a lot of memory and disk space and it adds overhead to the entire system. But without using an HLL,

DISCWARE

YOUR SUPPLIER FOR MOST POPULAR PROGRAMS

ASHTON - TATE

D Base III plus
D Base 4
Multimate Advantage II
Rapidfile
Framework III

BORLAND

Paradox V2
Paradox V3
Sidekick Plus
Quattro
Sprint
Turbo C V2
Turbo C Pro.
Turbo Pascal V5.5
Turbo Pascal Pro.
Turbo Basic V1.1
Turbo Prolog V2

QUATTRO $210

QUATTRO PRO $560

WORD PERFECT $530

LOTUS DEVELOPMENT

Allways
Freelance Plus
Lotus 123 2.2
Lotus 123 3
Symphony V2

SYMPHONY VER.2 $810

MICROSOFT AUSTRALIA

MS Chart
MS Excel
MS Flight SIM.
MS Learning DOS
MS Multiplan
MS Project
MS Windows 286/386
MS Word
MS Works
MS Basic
MS C Compiler
MS Cobol
MS Pascal
MS Quick Basic
MS Quick C
MS Quick Pascal
MS Mouse

MS WORD $450

MS QUICK BASIC $140

WHAT'S NEW IN SOFTWARE

Norton Backup
PC Tools Deluxe Ver.6
Timeline Ver.4
Microsoft Windows Ver.3

DESKTOP PUBLISHING

Xerox Ventura
Pagemaker (IBM)
GEM Presentation Team
Logitech Finesse
PFS First Publisher
GEM Desktop Publisher

VENTURA $1090

SPC SOFTWARE

Harvard Project Manager
First Publisher
First Choice V3
First Graphics
Harvard Graphics
Professional Write
Design CAD 2D/3D

HARVARD GRAPHICS $495

DIGITAL RESEARCH

GEM Desktop
GEM Graph
GEM Wordchart
GEM Artline
GEM Scan
GEM Presentation
GEM Desktop Publisher
GEM Programmers Tool Kit

DATABASE PACKAGES

DBXL V1.3
Q & A V3.0
Paradox
Clipper
R Base

PARADOX VER. 3 $730

UTILITIES SOFTWARE

Norton Guides
Norton Utilities/Adv V4.5
Norton Commander V2
Norton Editor

NORTON UTILITIES $135

SECURITY & ANTIVIRUS

PCLOCKOUT
PCMEDICAL

VIDEO CARDS

VEGA VRAM with 512 KB 16 BIT....$ave
VEGA Super VGA 512 KB 16 BIT....$540
VEGA VGA.....$440
VGA Wonder 512 16 BIT & Mouse...$780
VGA VIP.....$460
Great Wall VGA 8 BIT.....$299
Great Wall EGA.....$199

MONITORS

Philips range of VGA, EGA, Mono
NEC range of VGA - 2A, 3D, 4D, 5D
ECM range of VGA, EGA, Mono
Price Sample: ECM EGA $640.00
"NEC MULTISYNC 3D IS NOW $960.00

MODEMS

NetComm AutoModems.....$ave
NetComm SmartModems.....$ave
NetComm In/Modems.....$ave
NetComm Pocket Rocket.....$560
NetComm SmartModems M5 & M4.$ave

PRINTERS

Fujitsu range.....$ave
Toshiba range..... From $690
NEC range.....$ave
OKI range..... From $380

LASERS

Toshiba PageLaser.....$ave
Ricoh Postcript 2MB.....$6900
Hewlett Packard Range

STORAGE SYSTEMS

Miniscribe 20MB.....$380
Miniscribe 30MB RLL.....$440
Miniscribe 40MB–61ms.....$510
Seagate 42 MB–27ms.....$690
Miniscribe 71MB–22ms.....$1080
Toshiba 150MB–22ms.....$ave
Microscience 44MB v.coil.....$990

CALL FOR SOFTWARE NOT LISTED

DISCWARE (02) 212–6933

150 Broadway, Broadway, NSW 2007. FAX: 211–4065 TLX: AA 23509

ALL PRICES INCLUDE SALES TAX AVAILABILITY MAY BE LIMITED AT PRICES ADVERTISED. PRICES APPLY TO STOCK HELD AS AT [illegible]

E & OE

DISCWARE

* LEASE YOUR EQUIPMENT FROM AS LOW AS $3.50/DAY AT DISCWARE

EVEREX STEP™ 386/20/25/33

Advanced Features

- 20/25/33MHz Intel® 80386 microprocessor
- Effective zero wait-state operation
- Advanced Memory Management Architecture (AMMA™) with large write-back static RAM cache
- High performance, 1:1 interleave hard disk/floppy controller
- Programmable Configuration Select (PCS™) allows jumperless configuration of the system board
- Everex proprietary 32-bit memory expansion slot running synchronously with the CPU
- Shadow ROM remaps ROM to RAM for zero wait-state access to the BIOS
- Front access to five mass storage devices
- Real-time, alphanumeric status display

TOSHIBA T5100/T5200/T3200
NEW T3100SX NOW AVAILABLE

MODEL:	T5100	T5200	T3200
CPU:	386 16MHz	386 20MHz	286 12MHz
RAM	2 MB	2 MB	1 MB
DISK:	1.44 40 MB	1.44 100MB	1.44KB 40MB
I/OS:	Ser/Par/Exp	Ser/Par/Exp/2 slots	
Video	Plasma	Plasma	Plasma
Adaptor	EGA	VGA	EGA

SPECIAL OFFER
SHARP IQ-7000
FREE WITH ANY PURCHASE OF ANY OF THE ABOVE TOSHIBA LAPTOPS

FOR SMART PEOPLE ONLY

OLIVETTI 211 LAPTOP

- 80C286 Processor - 16MHz
- 1 MB of RAM LIM EMS 4.0
- 40 MB Hard Disk 27 ms
- EGA compatible LCD Backlight
- 16 bit Expansion Slot
- MS DOS 4

TOTAL PRICE
$4990.00 INC.TAX

OLIVETTI 111 LAPTOP

- 80C86 Processor
- 640 KB RAM
- 20 MB Hard Disk 27 ms
- CGA compatible LCD Backlight
- 8 bit Expansion Slot
- MS DOS 4

TOTAL PRICE
$2990.00 INC.TAX

PLUS SPECIAL OFFER
TILL END OF MAY:
Logitech mouse series 9
FREE with above systems.
Value $275.00

NEW OLIVETTI PC's RANGE
PCS286: AT 286 12MHz, 1MB RAM

ASHTON & TATE FRAMEWORK III
WORTH $900.00
PRICE - $0.00
WITH EVERY OLIVETTI LISTED BELOW

AT VGA mono, 20MB 27ms HDD, 1.44 MB FDD	$2899.00
AT, VGA color, 20MB 27MS HDD, 1.44MB FDD	$3299.00
AT VGA mono, 40MB 29ms HDD, 1.44 MB FDD	$3099.00
AT, VGA color, 40MB 29MS HDD,	$3499.00

PHILIPS COMPUTERS

MODEL:	3230	3345	3360	3370
CPU:	286/12.5 MHz	386/SX	386/25 MHz	386/33 MHz
RAM ON BOARD:	1 TO 4 MB	1 TO 8 MB	1 TO 8 MB	4 TO 8 MB
H/DISK:	20/40 MB	40/100 MB	160/340 MB	340 MB
F/DISK:	1.44 MB	1.44 MB	1.44 MB	1.44 MB
CACHE:			64 K	64 K
VIDEO:	VGA	VGA	VGA	VGA
CASE:	DESKTOP	DESKTOP	DESKTOP	TOWER

NOTE: On-Site Warranty on above systems available if required.

NOVELL NETWORKS

- **SELL - Latest equipment - computers and software**
- **SUPPORT - Telephone support and on-site support**
- **INSTALLATION - On-site installations tailored to specific needs.**
- **SPARE PARTS - Cards, Terminators, T-connectors, Add on software.**

FAX OR CALL FOR A QUOTATION

KAYPRO IS COMPUTERS

- Kaypro XT 10MHz + 20MB Hard disk + EGA Monitor.....$3.55 A DAY
- Kaypro AT KC2 12 MHz + 40MB V/C Hard Disk + EGA Monitor.....$5.50 A DAY
- Kaypro AT KC2 16MHz + 40MB V/C Hard Disk + EGA Monitor.....$6.10 A DAY
- Kaypro KC3 20MHz 386 + 40MB V/C Hard Disk + EGA Monitor.....$8.70 A DAY

KAYPRO 16 MHz COMPUTER REDUCED TO $3495

KAYPRO AT 16MHz 0 WAIT STATE COMPUTER
1Mb RAM Memory
1 x 51/4" Floppy drive
++ 40 Mb V. Coil Hard Disk
++ 16 Bit VGA card
++ NEC Multisync 2A
++ DOS operating system.... **All this for $3,495**

FREE dBASE4 WITH EVERY KAYPRO BOUGHT WHILE STOCKS LAST.

New Philips arrivals at Discware

"HARDWARE DISCOUNT CORNER"

ALR Flexcache 386
20 MHZ CPU,
150 MB Hard disk

All these for $8333 (including tax)

DISCWARE (02) 212–6933

150 Broadway, Broadway, NSW 2007. FAX: 211–4065 TLX: AA 23509

ALL PRICES INCLUDE SALES TAX AVAILABILITY MAY BE LIMITED AT PRICES ADVERTISED PRICES APPLY TO STOCK HELD AS AT 16-4-90
*LEASING OR RENTING CAN INCLUDE SOFTWARE – AVAILABLE ONLY FOR APPROVED CUSTOMERS.

E & OE

SMALL BUSINESS PRODUCTIVITY SOFTWARE FROM SPINNAKER

LOW COST — HIGH QUALITY!

EXCLUSIVE TO DICK SMITH ELECTRONICS

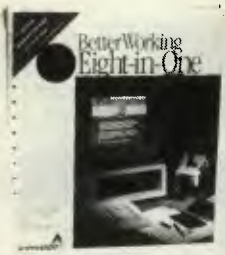
OUR GREAT RANGE OF BUSINESS SOFTWARE IS NOW EVEN BETTER — DON'T BE DECEIVED BY OUR LOW PRICES — OUR DIRECT BUYING MEANS WE CAN PASS THE SAVINGS ON TO YOU.

ONE PERSON OFFICE

Even more than an accounting package! Run your entire office by computer.

- Files 360 different types of expenses
- Keeps tabs on all your important clients
- Lets you design your own invoices and much more.

Cat X-9404 **$149**



8 IN ONE

All the programs you need for the home or office in one integrated package!

- A fully featured Word Processor
- A Desktop Organizer that tracks your appointments and organizes your 'must do' list
- An Outliner to help arrange your points into a coherent writing plan
- A Spreadsheet that reads Lotus 123 worksheets
- A Communications package that takes full advantage of your Hayes compatible modem
- A Data Base that's compatible with dBase III files
- Living Graphics to create all sorts of charts and graphs

Cat X-9402 **$99**

TRI-PACK DISK UTILITIES

The 3 handiest disk utilities are now available in one package!

- A Disk Cache utility to speed up your disk access time
- A File recovery program to resurrect accidental file deletions
- A Menu Program to let you use all the features of your file system without exiting to DOS

Cat X-9732 **$39.95**

THE WRITER

A simple to use Word Processor with amazing versatility!

- Search and Replace features
- Page layout display means what you see is what you print
- Special print features include boldface, italics, and Underline

Cat X-9100 **$24.95**

CARDS, SIGNS, & CERTIFICATES

Create your own signs and artwork with this powerful graphics program

- Create Cards with ready to use graphics
- Super Signs in letters up to 7" tall. Combine them with clip art to grab attention.
- Special Certificates with decorative borders and other features to add professional polish

Cat X-9925 **$24.95**

RESUME CREATOR

Present a professionally finished resume to your prospective employer.

- Just fill in the blanks- Resume Creator does the rest
- Choose the options that best suit you from drop down menus
- Print your resume on any of the 250 printers supported

Cat X-9102 **$24.95**

DESK ORGANIZER

It's like a personal secretary! Keeps track of your appointments and organizes your work schedule.

- 8 of the most useful desk top tools in one program
- Calendar and world clock
- Address and telephone book
- Memo Pad and 'To Do' list
- Use DOS commands without leaving the program

Cat X-9521 **$24.95**

THE FILER

Unlike the cardboard alternative, The Filer is convenient and fast!

- Simplifies the storage, selection, and reporting of information
- Drop down menu interface for all commands
- Search and select on 10,000 records per file
- Print reports and labels for mass mailing

Cat X-9300 **$24.95**

• **NSW** • Albury 21 8399 • Bankstown Square 707 4888 • Blacktown 671 7722 • Brookvale 905 0441 • Bondi 387 1444 • Campbelltown 27 2199 • Chatswood Chase 411 1955 • Chullora 642 8922 • Gore Hill 439 5311 • Gosford 25 0235 • Hornsby 477 6633 • Hurstville 580 8622 • Kotara 56 2092 • Liverpool 600 9888 • Maitland 33 7866 • Miranda 525 2722 • Newcastle 61 1896 • North Ryde 878 3855 • Parramatta 689 2188 • Penrith 32 3400 • Railway Square 211 3777 • Sydney City 267 9111 • Tamworth 66 1711 • Wollongong 28 3800 • **ACT** • Fyshwick 80 4944 • **VIC** • Ballarat 31 5433 • Belmont 43 8522 • Bendigo 43 0388 • Box Hill 890 0699 • Coburg 383 4455 • Dandenong 794 9377 • East Brighton 592 2366 • Essendon 379 7444 • Footscray 689 2055 • Frankston 783 9144 • Geelong 232 711 • Melbourne City 399 Elizabeth St 326 6088 and 246 Bourke St 639 0396 • Richmond 428 1614 • Ringwood 879 5338 • Springvale 547 0522 • **QLD** • Brisbane City 229 9377 • Buranda 391 6233 • Cairns 311 515 • Chermside 359 6255 • Redbank 288 5599 • Rockhampton 27 9644 • Southport 32 9033 • Toowoomba 38 4300 • Townsville 72 5722 • Underwood 341 0844 • **SA** • Adelaide City 223 4122 • Beverley 347 1900 • Elizabeth 255 6099 • Enfield 260 6088 • St. Marys 277 8977 • **WA** • Cannington 151 8666 • Fremantle 335 9733 • Perth City 481 3261 • Midland 250 1460 • Northbridge 328 6944 • **TAS** • Hobart 31 0800 • **NT** • Stuart Park 81 1977

ORDER BY PHONE OUTSIDE SYDNEY (008) 226610 Free Call Sydney Area 888 2105

there's very little you can do to optimise the interface.

The dBASE language

When you consider all of the steps that a single dBASE command encapsulates (including updating and reordering indexes), the value of a DBMS language becomes obvious. In dBASE IV, for example, issue the command

```
USE contacts
```

where ***contacts*** is the name of the database file and dBASE IV will automatically open the database file, read the database structure of the file as well as the statistics recorded in the file header (number of records, last update and so on), open any related multiple index (MDX) file, determine which record is the first in MDX order, and read that record into an internal buffer. Depending on which database library or engine you use, each of these operations may require many lines of C code to implement.

DBMS languages hide many of the file-handling details inherent in database systems from the application, including the underlying database and index file formats. And for the most part, the application does not need to know the file formats, nor does it need to know how to access them. This is the single greatest advantage of DBMS languages. But you pay a price for this.

Inevitably, some day some application will need to know how the database files are managed. Then what do you do? There's no facility in the dBASE language for going around dBASE. And anyway, a dBASE application can only read, write and update dBASE files. It can use dBASE's import and export facilities to move data from one file format to another, but it can only access the formats it supports (text and comma-delimited formats, for example) and cannot read these formats directly. Ultimately, you'll have to custom-write a program in C or some other high-level language in order to access the database data.

Another disadvantage to programming in dBASE is that since you can't get very close to the machine — if at all — it's difficult if not impossible for dBASE to access external devices such as serial ports.

dBASE and networks

dBASE also hides network communications and network file handling from the application. If it knows the file and record-locking commands to prevent other applications or users from changing data, an application can access a lot of database information without being aware that the database resides on a network.

Unfortunately, it's costly to implement a large application on a large network. Network applications are implemented via LAN packs, each of which support a specific number of workstations. The more workstations, the more LAN packs you need. So unless you can find a LAN pack that supports an unlimited number of workstations, the cost can be prohibitive.

'Increased performance is perhaps the biggest reason to develop applications using an HLL . . . HLLs also give you greater control over an application's use of a library or database engine.'

Performance

Generally there's little you can do to optimise performance in dBASE-like systems. A few DBMSs offer 'hooks' that let you improve their performance; for example, by setting the number of internal buffers. And, of course, the way in which your application uses the system can affect its performance. To create an efficient application, make sure you close files as soon as possible. Also, check which indexes you're using. Are you making dBASE search more than it needs to? Keeping more files open than necessary takes up memory that could be put to better use. And making dBASE perform unnecessary searches can slow your machine to a crawl.

But more likely than not, the system is operating at its peak. For although interpreted applications simply cannot run as fast as compiled HLL applications, performance is strictly a factor of the underlying DBMS. This shifts the bulk of the blame for poor performance from the application to the underlying database system — or from the developer to the person who chose the system!

Portability

The rule here is: if the DBMS is available on the platforms where your application must run, then portability is usually not an issue. You can, for example, port dBASE applications to FoxBASE and other clones without too much difficulty; you can even port an application between platforms that support dBASE.

The level of difficulty of porting an application is in direct proportion to the extent that the application you're porting uses unique features of dBASE or FoxBASE, or a particular version of either.

If the DBMS is not on a platform where your application needs to run (such as Microsoft Windows, OS/2 or Unix), too bad. And vendors can't be counted on to release a new version for all platforms simultaneously. For instance, long after dBASE III Plus and dBASE IV had been released for DOS, the only version available for Unix was dBASE III.

Debugging

In general, dBASE programs are easier to test and debug than those of a high-level language. There's much less that can go wrong. The unique memory-handling features make it almost impossible for a dBASE program to crash dBASE or its debugger. dBASE programs are also easier to debug because the language is inherently an interpreted one. Interpreted languages let you individually test each line of code at the dot prompt — an impossible exercise with HLLs. An interpreted language also means a shorter debugging process. There's no time-consuming edit-compile-link-run cycle, as there is with compiled languages.

dBASE is all you need

Unlike HLLs, dBASE and its clones do not require a compiler or linker. They have built-in facilities for interpreting dBASE programs and executing program instructions.

However, this capability also limits what you can do with dBASE; if you require a feature that dBASE doesn't support, you simply have to wait until a new version supports that feature — or find an alternative. For instance, if the statistical analysis capabilities of a DBMS aren't up to speed, or if the program offers windowing but not a graphical user interface, you're stuck when your application demands these things.

Quick startup

Interactive front ends, such as that of dBASE, lend themselves to quick startups because you don't have to complete a program before users can begin to enter data. Instead, using EDIT and BROWSE commands, users can enter data early in the life of a database.

The nature of the dBASE language also

No Sweat

The Intel® Math CoProcessor can put Quattro Pro, Paradox, Turbo C and Turbo Pascal through their paces up to *three times faster.*

You may own the world's fastest personal computer but the microprocessor in it is a slug when it comes to performing complex math functions. It was only designed to handle simpler calculations. Anything more complicated has to be sent back to the software program to be chopped up into simpler pieces the processor can handle.

Unless you have a Math CoProcessor.

A Math CoProcessor takes over all these math functions, handling in one instruction what would have required many steps with a standard processor.

Speed has its price. Fortunately, it's not much.

You'll be happy to know there's an Intel Math CoProcessor for every IBM-compatible PC and that these chips are very affordable.

A small price to pay when you consider what your time is worth. It also pays to buy the real thing.

Intel Math CoProcessors are guaranteed to be compatible with your current microprocessor (which Intel designed, of course) and future technologies, PLUS a 5-Year Warranty.

FREE. No-Sweat Sweats

When you purchase an Intel Math CoProcessor and either Borland's Quattro Pro, Paradox, Turbo C or Turbo Pascal by July 31st, 1990, we'll send you a complimentary Tracksuit.

This quality black tracksuit is a poly/cotton blend, available in unisex sizes S, M, L, or XL.

Simply fill in the order coupon enclosed with any of the specified Borland products together with the *No Sweat* flyer from an Intel Math CoProcessor package (from Tech Pacific) and your registration card.

Look for these stickers

intel® PCEO

BORLAND

distributed by:

Tech Pacific
LEADERS IN PC ENHANCEMENT

SYDNEY: 5-15 Epsom Rd, Rosebery, NSW 2018. Ph (02) 697 7111
MELBOURNE: 219 Glenhuntley Rd, Elsternwick, Vic 3185. Ph (03) 523 0866
BRISBANE: 165 Moggill Rd, Taringa, Qld 4068. Ph (07) 371 7866

allows end users to access and use the database without having to learn any programming skills. With a few simple dot-prompt commands, end users can access a lot of database information.

Aside from the obvious benefits of quickly establishing a usable system, this also saves a lot of programming time. When you have people using a system, entering and accessing data, you'll quickly hear what's wrong (and maybe even what's right) with your program. You'll also know what they like and what they find difficult to use or understand. A smart programmer knows how valuable this information is in the early development stages — not only because it saves programming, testing and debugging time, but also because heeding users' advice and suggestions as much as possible will go a long way towards their ultimate acceptance of a given program.

Architectural restrictions

The dBASE database model was originally conceived over 10 years ago; it's based on mainframe technology that was available in 1979. Although the underlying implementations have changed, there are some limits inherent in its structure, particularly when you want to perform relational operations. A fully relational database system would make an application easier to write and maintain. Thus, you might find yourself redesigning your application to fit the DBMS where the latter is simply not flexible enough to do the job required.

HLLs: pros and cons

Increased performance is perhaps the biggest reason to develop applications using an HLL: a database engine application doesn't include the overhead of an interactive end-user interface, and the application code is compiled, not interpreted.

HLLs also give you greater control over an application's use of a library or database engine. However, unless you have the source code, your influence is still limited (although certainly better than with dBASE). If the database library or engine source code is available, you can fine-tune the database system for performance purposes. You can also prevent unused database routines from being included in the application unnecessarily, or add overlay capabilities. However, if the code is unavailable, your only alternative is to 'roll your own' library.

Flexibility

After performance, flexibility is perhaps the next reason to consider writing a database application with an HLL combined with a database library or engine. You can do almost anything you like and yet still retain enough flexibility to make the database engine fit the application.

Creating an application that's database-independent is one example. Using an HLL, you can add a 'database-knowable' layer to the application. This layer could make calls to specific engine functions, shielding 'knowledge' for the engine from the rest of the application. Thus, future versions of the application would not be tied to any specific database. For instance,

```
open_database();
```

might be a call to a function that would open a dBASE database (as in the USE example given above). But to move to another database (FoxBASE, for example), just change the **open_database** function and its siblings. The application is never tied to the database, since the function can be altered to use *any* database engine or library.

HLLs allow your application to get closer to the underlying hardware. For instance, if you need to add a facility to download data from a serial port into your database, you can write an interface into the application to do so.

You can also add other capabilities via third-party libraries. Instead of writing a serial-port interface as in the previous example, you might be able to buy a library that provides serial-device support routines. Then you'd simply have to link it into your application. Other capabilities, such as statistical services or windowing facilities, can be added to the application in this manner.

An HLL database application doesn't have the file-handling and network restrictions common to those created with dBASE. It can know the underlying database file format and access method as well as other file formats, and can update data in any file whose format it understands. Furthermore, most database libraries don't limit the number of network workstations your application can support.

HLL applications, particularly those written in C, are also more flexible because they will be more portable than dBASE applications. C is available on every machine from a Commodore 64 to a Cray-2. And a vendor is more likely to port a database library from one platform to another than an entire DBMS like dBASE.

HLL debugging

HLL applications, particularly those written in C and Pascal, are more difficult to debug than dBASE applications. Not

How to employ a top 'Business Manager' without increasing your payroll

NEW MULTI-USER NETWORK RELEASE

Recruit our Information Business Manager- over 8000 Australian companies already have!

The New multi-user network Business Manager provides a comprehensive fully-integrated software package for all your accounting and management needs.

- Debtors
- Creditors
- Invoicing
- Sales order
- Stock control
- Purchase orders
- General ledger
- Job costing
- Bill of materials
- Point of sale
- Automatic billing
- **even Payroll!**

No competitive package offers you so many features in such a flexible and easy-to-use format. Available in single or multi-user versions, Information Business Manager is designed to grow with your business.

Best of all, you can buy Information Business Manager for as little as a week's salary.

For a FREE demonstration disk contact your leading computer retailer or Information Unlimited:

Melbourne:	Ph (03) 813 3022	Fax (03) 882 5887
Sydney:	Ph (02) 387 3300	Fax (02) 387 8138
Brisbane:	Ph (07) 857 4264	Fax (07) 260 5926
Perth:	Ph (09) 444 5000	Fax (09) 444 6229

Information Unlimited (Aust.) Pty. Ltd.

Response 2902

only is it easier to introduce bugs in these applications, but then you have to be able to distinguish between application bugs and library bugs. And because you use more than one body of software developing HLL applications, you are more vulnerable to bugs introduced by compiler code generation and optimisation.

HLLs call for experience

To build well-structured HLL-based applications using a language that neither demands nor enforces structure definitely requires experience. It also takes skill to build a strong library interface where the application doesn't have to know a great deal of underlying detail about the library and engine, and where many tasks are encapsulated into a single library function call.

A seasoned developer knows the consequences of recklessly using a pointer: it can destroy program data and data files, and cause the application and the system to crash. Experience also teaches you that certain bugs may 'disappear' when you change the program (as by adding a debugging statement) only to 'reappear' later; and database libraries implemented as TSRs are prone to crashing the system and conflicting with other TSRs or device drivers — particularly network drivers.

'HLL applications are more flexible because they will be more portable than dBASE applications.'

They can also take up more memory, since the entire engine remains resident, whereas an overlayed system does not.

Overhead

Unless you're using an engine or library that's connected to an interactive front end, you'll have to write programs just to establish data entry screens. This could prevent data entry from beginning early in the development cycle, or could unnecessarily delay the early stages of program development.

Also, there's a high likelihood that it will take more work to write the code for implementing multi-user file handling on a network, whereas this may be transparent with dBASE.

You usually require additional software to create an HLL application: compiler, linker and so on. And you may need to purchase updated versions of the database library or engine as updates of the compiler software are released.

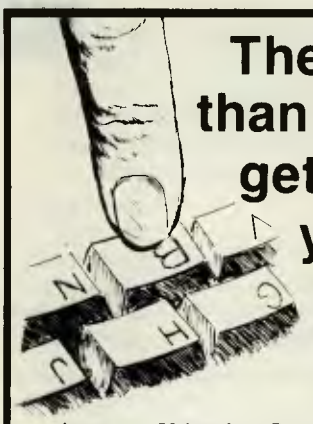
Next time

One of the most recent database engine releases is Paradox Engine from Borland. In the next issue, we'll dig in and take a close look at Paradox Engine and why it makes a strong case for developing applications using HLLs.

Let us hear from you

Share your database experiences, and we'll pay up to $50 for any tips published. Send them on disk and in printed form to Databases, *APC*, 122 Ormond Road, Elwood 3184. Disks cannot be returned unless a stamped, self-addressed package is enclosed.

EN



There is more than one way to get data into your PC,XT, AT, PS/2

CONTEC

have over 50 Interface Boards priced from a low $210, including Analogue I/O (12-bits), High Speed (100KHz), Digital I/O Multiplexers, Counter/Timers, Remove I/O Network, Stepper Motor Driver and Termination Boards. 3 year guarantee.

Driver software for both compiled and interpretive programs will get your application up and running in the shortest possible time.

EXTEND THE POWER OF YOUR PC!

INSPEK TECHNOLOGY

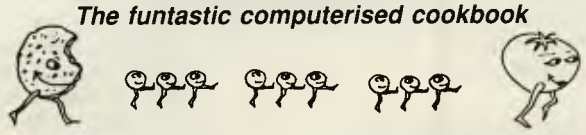
A DIVISION OF AUST-AMEC PTY LIMITED (INCORPORATED IN N.S.W.)

70 Hassall Street, Wetherill Park, N.S.W. 2164

Sydney	Melbourne	Perth
(02) 609 1333	(03) 376 1186	(09) 470 3688

COOKDISK

The funtastic computerised cookbook



The computerised cookbook, containing around 2000 delicious recipes & cocktails. Find recipes by index, meal type, temperature, cooking process and keywords. Add, edit and group recipes, change seves, print shopping lists and recipes. Calculate kJ/calories or cup quantities. Includes an extensive glossary; wine, cheese, herb & oven charts; healthy hints; context sensitive help and an excellent tutorial. Cookdisk is easy to use, can be enjoyed by the whole family and will last a life time. Minimum system requirements: IBM/compatible & 256kb.

100% AUSTRALIAN

☐ Please send me Cookdisk. I enclose $90.00 (includes Courier).
☐ Please send me a demonstration disk. I enclose $3.00.
Disk size required ☐ 5.25" ☐ 3.5"

Make cheques or money orders payable to
JBT Enterprises Pty Limited
I prefer to pay by credit card, please charge my
☐ Bankcard ☐ Mastercard ☐ Visacard
Card No. _____ Expiry date _____
Name _____
Street Address _____
_____ Postcode _____

Send form to FREEPOST 15, PO BOX 152, BALMAIN NSW 2041
or fax it to (02) 818-1206. Phone (02) 810-3223

Dealer inquires welcome

WHAT DOES IT TAKE TO BE COMPLETELY ORGANISED?

PERSONAL ORGANISER

THE PORTABLE POCKET SIZE INFORMATION MANAGER THAT REMINDS, NOTES, FILES, TRANSFERS, CALCULATES AND ORGANISES!

INCLUDES SIDEKICK SOFTWARE AND PC ADVANTAGE SOFTWARE

FEATURES

- Includes databank, data exchange software and cable
- Large 20 character viewing area
- 8K Memory
- 7951 characters or 395 full name and phone number entries
- Security codes to keep entries private
- Auto-off after 2 minutes
- Battery back-up
- Audio tone when pressing key
- Leather-like case

Cat X-5100

ALL FOR JUST

$249

DICK SMITH COMPUTERS

• **NSW** • Albury 21 8399 • Bankstown Square 707 4888 • Blacktown 671 7722 • Brookvale 905 0441 • Bondi 387 1444 • Campbelltown 27 2199 • Chatswood Chase 411 1955 • Chullora 642 8922 • Gore Hill 439 5311 • Gosford 25 0235 • Hornsby 477 6633 • Hurstville 580 8622 • Kotara 56 2092 • Liverpool 600 9888 • Maitland 33 7866 • Miranda 525 2722 • Newcastle 61 1896 • North Ryde 878 3855 • Parramatta 689 2188 • Penrith 32 3400 • Railway Square 211 3777 • Sydney City 267 9111 • Tamworth 66 1711 • Wollongong 28 3800 • **ACT** • Fyshwick 80 4944 • **VIC** • Ballarat 31 5433 • Belmont 43 8522 • Bendigo 43 0388 • Box Hill 890 0699 • Coburg 383 4455 • Dandenong 794 9377 • East Brighton 592 2366 • Essendon 379 7444 • Footscray 689 2055 • Frankston 783 9144 • Geelong 232 711 • Melbourne City 399 Elizabeth St 326 6088 and 246 Bourke St 639 0396 • Richmond 428 1614 • Ringwood 879 5338 • Springvale 547 0522 • **QLD** • Brisbane City 229 9377 • Buranda 391 6233 • Cairns 311 515 • Chermside 359 6255 • Redbank 288 5599 • Rockhampton 27 9644 • Southport 32 9033 • Toowoomba 38 4300 • Townsville 72 5722 • Underwood 341 0844 • **SA** • Adelaide City 223 4122 • Beverley 347 1900 • Elizabeth 255 6099 • Enfield 260 6088 • St. Marys 277 8977 • **WA** • Cannington 451 8666 • Fremantle 335 9733 • Perth City 481 3261 • Midland 250 1460 • Northbridge 328 6944 • **TAS** • Hobart 31 0800 • **NT** • Stuart Park 81 1977

ORDER BY PHONE OUTSIDE SYDNEY (008) 226810 Free Call Sydney Area 888 2105

PLEASE SEND ME FURTHER INFORMATION:
ON THE DATASTOR 8000 PERSONAL ORGANISER

NAME _____

ADDRESS _____

_____

TELEPHONE NO. _____

X-5100 APC/ 490

POST TO:

DICK SMITH ELECTRONICS PTY LTD
PO Box 321
NORTH RYDE NSW 2113

NASHUA'S DISKETTE COPYING SERVICE OPERATES UNDER MAXIMUM SECURITY.

There's no escaping the fact that security is vitally important when you get diskettes copied. Which is why Nashua go to great lengths to maintain absolute security. It means you can copy confidential information with absolute confidence. What's more, each copy is verified to ensure it's error-free. And with their national network they have the whole country tied-up. To risk any other copying service would be criminal.

Nashua
DISKETTE COPYING CENTRES

For prompt service phone: Sydney (02) 958 2044, Melbourne (03) 428 0501, Canberra (062) 47 0511, Brisbane (07) 369 4244, Adelaide (08) 362 0021, Perth (09) 328 1888.

NA 002

PAN.COM: the program animator

With this versatile script language utility from Pete Maclean, you can add opening menus, schedule automatic operations and customise your programs' operations.

Would you like to be able to bring up Lotus 1-2-3 with a menu that would offer you a choice among specific worksheets? Automate your APC MAGNET login? Modify DOS commands to customise their operation?

PAN.COM, this issue's utility, gives you the ability to accomplish these and any number of other tasks, from setting up program demonstrations and automating program start-ups, to arranging for a backup or file transfer program that can run automatically and unattended in the middle of the night.

PAN is a Program ANimator, a utility designed to automate PC applications. You might think of it as a universal script language. For each job you want it to do, you must provide PAN with a command script. A few ready-made PAN scripts will be presented here and others will be available from APC MAGNET, but generally you'll have to write (program) your own. Fortunately, anyone who has dabbled with Basic, used the script language of a communications package, or worked with the macro language of a spreadsheet program will be able to put a PAN script together quite easily. With PAN, you simply write commands to load and run applications, to feed them simulated keyboard input, to write messages to the screen, and to take advantage of several other capabilities PAN provides.

The program and its source code is available for downloading from APC MAGNET on Telecom's Discovery 80; alternatively you can send in a blank, formatted, 360K 5.25in disk with a stamped, self-addressed package to May Productivity, 122 Ormond Road, Elwood 3184. Additional user-submitted PAN scripts and updated versions of PAN.COM itself will be available only via APC MAGNET.

To create PAN.COM from the source code requires using a macro assembler (IBM or Microsoft, version 2 or later) and the following commands:

```
MASM PAN;
LINK PAN;
EXE2BIN PAN PAN.COM
```

Getting started with PAN

As an introduction to PAN's command language, we'll start with the short sample script shown in Fig 1. This script, MORE.PAN, is designed to modify the operation of the DOS MORE program, which scrolls text directed into it onto the screen in 24-line batches. After displaying each 24-line group MORE.COM will post the prompt

```
-- More --
```

on the 25th line and wait for you to press a key. When you do, it scrolls out the next 24 lines.

Suppose you want to make the MORE program operate by paging rather than by scrolling. That is, before it displays each screenful of text, you want MORE to clear the screen and home the cursor instead of scroll up the new text from the bottom. Many people prefer this kind of display, as it's hard to read text that is being scrolled on a PC monitor.

To use the MORE.PAN script of Fig 1 to page through a file, you would simply enter

```
PAN MORE < FILE
```

The standard file name extension for scripts is .PAN, so if no extension is included in the command, that default is assumed. Now let's look at how the script works.

PAN commands are written one per line. Each starts with a keyword such as Load, Output and Label, and may be followed by arguments of various kinds. Blank lines are ignored, as are comment lines, which are identified by an initial asterisk. A complete list of commands with hints for how to use them is given in the text box, 'The PAN command set'.

The first line in the MORE script in Fig 1 contains a Load command. This tells PAN to load the MORE program from your DOS directory. (You'll need to change the pathname for MORE if you keep that program in a different directory or drive.) MORE is then loaded into memory above PAN itself. Execution of MORE commences only after the next PAN command, Go, is performed. Once MORE is started, PAN continues to operate in the background and can exert limited control over the program's progress.

The next line in the script defines a label that is used further on as the object of a Jump command. The WaitScreen command tells PAN to wait for MORE's prompt to appear. The first two arguments to WaitScreen indicate where on

MORE.PAN COMPLETE LISTING

```
Load "c:\dos\more.com"
Go
Label loop
     WaitScreen 24 0 "-- More --"
     GetKey
     Wipe
     Cursor -1 0
     Key " "
Jump loop
```

Fig 1 A simple PAN script file that enhances the DOS MORE command so that it pages text instead of scrolling it

The PAN command

PAN script commands are entered one per line, and any amount of 'white space' (blanks and tabs) may be inserted before and between fields. Each command begins with a keyword, such as Output or Label. Keywords may be entered in any combination of upper and lowercase. String arguments may be delimited by any character, though double quotes (as used below and in the figures) are suggested for the sake of readability.

Note that PAN does little error checking. If a script does not do what you expect, consider the possibility that there is some error — a missing EndIf perhaps — that a compiler or other typical language processor would catch but that PAN does not.

In the syntax shown below, italics are used to denote user-entered variables, for example ***row*** for a row number. Decimal numbers are used unless otherwise indicated. The virgule (|) indicates a choice between or among parameters.

Script commands

Break on | off determines how PAN handles a Ctrl-C. If the GetKey command retrieves a Ctrl-C when Break is set on, PAN treats it as an abort and terminates (if no program is running). If Break is set off, then a Ctrl-C is handled as any other character. (Note: Ctrl-Break receives no special handling in the original version of PAN, but this may be changed in future versions available on APC MAGNET.)

Cursor *row column* positions the cursor at a location on (or off) the screen. As with all PAN commands that refer to screen co-ordinates, the *row* and *column* arguments are entered as decimal integers numbered from zero, with the top left corner of the screen being row 0, column 0. No check for legal values is made, and no error indication is given. If an argument is omitted or invalid (that is, non-numeric), a default value of zero is used. Note: the cursor can be made to disappear by moving it to a location beyond the limits of the screen, for example, by entering the command:

```
Cursor 25 0
```

Else reverses conditional execution inside an If . . . EndIf command group.

EndIf terminates the effect of an IfKey or IfLoad command. Every If command should have a matching EndIf, but PAN does not check for this.

Flush flushes the keyboard holding buffer. This command is generally used in association with the GetKey command to discard any accumulated key-codes before soliciting a keypress.

GetKey waits for the user to enter a keystroke, which then becomes available for testing with the IfKey command.

"**Go *argument(s)***" initiates execution of a program that has been loaded with the Load command. The program is run as if it had been started from the DOS prompt with the given *argument* string.

IfKey "***list***" tests whether the last keypress (that is, that captured by a GetKey command) matches one of those in the given *list*. If there is a match, the subsequent commands are executed. If the match fails, then command execution is inhibited until a matching Else or EndIf command is encountered. For example, the command

```
IfKey "1234567890"
```

would result in a match if any digit were pressed.

IfLoad "***file***" attempts to load a program into memory for subsequent execution. The filename of the program must end in .EXE or .COM, and the extension must be included as part of the *file*. Execution of the loaded program does not start until a Go command in the script is encountered. The commands following the IfLoad are performed if the load is successful; if it fails, the commands following an Else or EndIf are performed. For example:

```
IfLoad "c:\program.com"
    Output "The program has
     been loaded
     successfully!^M^J"
    Go
    Quit
Else
    Output "The program could
     not be loaded!^M^J"
    Quit
EndIf
```

Jump *label* transfers control to the given *label* (see the Label command).

Key "***string***" feeds the characters that make up *string* to the running program by entering them, one by one, into the keyboard holding buffer. This simulates user keyboard input. Thus, for example, the command

```
Key "Yes[Enter]"
```

Continued . . .

the screen the given text is expected to be displayed. Since rows and columns are counted from zero, the 24 0 indicates the start of the bottom line.

GetKey waits for and reads a keypress which, in MORE's case, signifies that the user wants to proceed to the following page of text. GetKey enables PAN to intercept the keypress that would normally go to MORE. This gives PAN a way to test *which* key is pressed, though in this case that ability is not required — any key will serve the purpose. The Wipe command clears the screen and returns the cursor back to the home position (row 0, column 0). The Cursor command moves the cursor again, effectively to row –1.

This cursor position adjustment is needed, because after receiving a keypress from the user, MORE issues a carriage return and line feed. Try the script with **Cursor –1 0** omitted and you'll get an irritating one-line bounce as each screenful is displayed.

The Key command is used to simulate a user typing at the keyboard. In Fig 1, it issues a single space that prompts MORE to write out another 24 lines to the screen. Finally, the Jump command returns control to the command following the label **loop**. I have indented the commands within the loop simply for readability; PAN does not require it.

Using this enhanced version of MORE can be made even easier by taking advantage of the ALIAS utility presented in our January 1990 issue. If you set up an alias, for example

```
ALIAS MORE C:\UTILITY\PAN
   C:\UTILITY\MORE
```

then whenever you type MORE at the DOS prompt, the full

```
C:\UTILITY\PAN C:\UTILITY\MORE
```

will be substituted. (This assumes that you keep PAN and its scripts in a directory called C:\UTILITY.)

You'll find other useful ways of playing around with MORE. You might, for example, replace the

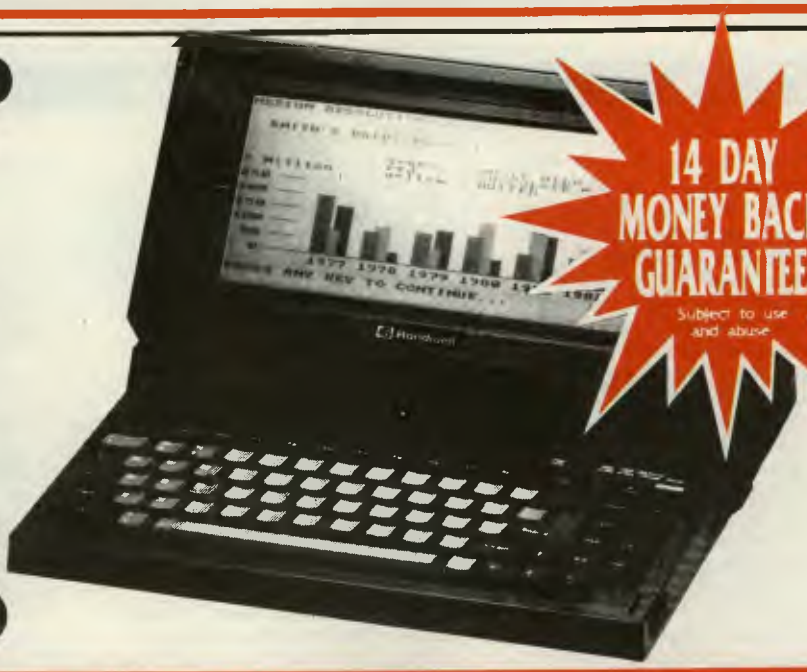
```
GetKey
```

with a command such as

```
Pause 10 seconds
```

This tells PAN to wait for 10 seconds after each page of text, and then it automatically proceeds to the next page.

SNAP UP TOP LAP TOPS



14 DAY MONEY BACK GUARANTEE
Subject to use and abuse

Bondwell Dual Floppy Laptop $999 Tax Inc.*

* Plus $99 for Carry Case

- Dual 720K 3.5" floppy disc drives
- Ultracompact and lightweight
- 8MHz 80C88 microprocessor
- 640K random-access memory
- 10.5" supertwist nonglare LCD
- Removable rechargeable battery pack

Bondwell 20Mb 286 AT Laptop $2795

- 80286-10 CPU
- 1Mb RAM on-board
- 1.44Mb FDD
- 20Mb Hard Disk
- Seperate Numeric Keypad
- Backlit LCD Screen
- 1200 bps Hayes Modem
- MS-DOS 3.3/GW-BASIC
- Carry Case Included
- 12 Months Warranty

Phone for brochure on further information.

LATTICE LOGIC PTY. LTD.
P.O. BOX 528 HAWTHORN
VICTORIA 3122

LATTICE LOGIC LIMITED

PHONE ORDERS (03) 818 3545
FAX ORDERS (03) 819 2073
We accept BankCard, Visa & MasterCard
Post & Packaging $10.00 Insurance $5.00

The PAN command

produces an effect which is equivalent to that of a user typing Yes and then pressing the Enter key. Note: the Key command is valid only when PAN is actually running a program.

Label *label* defines a *label* that can be used as the object of a Jump command. This command is in most respects a no-operation.

Load "*file*" loads a program (*file*) into memory for subsequent execution. As with IfLoad (above), the .EXE or .COM extension must be included, and program execution does not begin until a Go command in the script is processed. Should the load fail for any reason, PAN provides a suitable diagnostic message and terminates. If the user wishes PAN to maintain control after a failed load, the IfLoad command should be used instead.

Output "*string*" displays a *string* on the screen at the current cursor location. The cursor is updated in the process. The Output command should be used when using PAN to animate applications (like DOS utilities) that simply scroll the screen. (The Screen command, by contrast, should be used with screen-oriented applications.) Because Output invokes a DOS service to write to the screen, it cannot be used while PAN is running a program. Here is an example:

```
Output "This string scrolls
   onto the screen.^M^J"
```

(Note: ^M^J stands for a carriage return plus a linefeed.)

Pause n T| S| M pauses for a specified period. Permissible values of *n* are 1 to 255 for T (ticks) or S (seconds); or 1 to 60 for M (minutes). (The timer ticks on a standard PC occur at a rate of 18.2 per second.) You could invoke a delay of 2.5 minutes by entering:

```
Pause 2 minutes
Pause 30 seconds
```

PAN interprets only the first letter of the units field, that is, T, S or M. If the units field is omitted, PAN assumes seconds.

Quit terminates PAN. If PAN is not running a program, it quits immediately. If PAN is running a program, then it quits only when that program ends.

Screen *row column* "*string*" writes a *string* of characters to the screen, starting at the character position defined by the *row* and *column* numbers (0 to 24 and 0 to 79, respectively). Thus, for example:

```
Screen 10 40 "This appears on
   line 10 starting at column 40"
```

The operation uses a direct write to the video buffer. The video attribute used is that set by the last Video command.

TypeRate *ticks* controls the rate at which characters are fed by the Key command into the keyboard holding buffer. The number to be entered represents the count of the 18.2-to-a-second *ticks* to be skipped between each pair of keyed characters. In most situations, setting TypeRate to zero is the best choice; the keys are then fed to the animated program as quickly as it will accept them. However, if you want the user to clearly see what is being 'typed', a TypeRate between 2 and 9 is suggested.

Video *attribute* sets a video attribute for writes by subsequent Screen commands. Note: the number entered for *attribute* is in hexadecimal notation. The default screen attribute (70h) sets a white foreground and black background.

WaitChild suspends PAN activity until the animated program terminates.

WaitScreen *row column* "*string*" waits for the specified *string* to appear on-screen, starting at the position indicated by the *row* and *column* numbers. PAN continually searches for the string in the video buffer.

Note: use this command with care. PAN will wait forever, if necessary, for the string to appear, and you may be left with no way to interrupt the wait other than to press Ctrl-Alt-Del.

WaitUntil *HH:MM* suspends activity until the specified time of day, expressed in 24-hour notation. For example, to wait until 10:15pm, your script would contain the line

```
WaitUntil 22:15
```

Continued . . .

Safer formatting

Fig 2 shows a PAN script designed to eliminate the danger of accidentally destroying the contents of a hard disk with the DOS FORMAT program. The idea of this script is to provide an interface to the FORMAT utility that restricts users formatting to floppy disk drives A: and B:. While the same restriction could be implemented with a DOS batch file, FORMAT.PAN gives us an opportunity to introduce and explain additional script commands provided by the PAN command set.

The first line in this example again uses PAN's Load command. The Output command on the second line prompts the user to enter A or B to identify the drive containing the disk to be formatted. The third line defines a label that is referenced by a Jump instruction further on. The GetKey command waits for the user to press a key, then stores that key within PAN for later testing by the IfKey command.

The next section consists of a series of tests on the key struck by the user. The first IfKey command tests whether the key was **A** or **a**. If so, the commands between IfKey and EndIf are executed. (Again, these commands are indented here only for readability.) The Output command echoes the character typed at the keyboard by the user and issues a new line. The Go command transfers control to the loaded program with 'A:' as a command line. Thus, a combination of the PAN commands

```
Load "c:\dos\format.com"
Go "A:"
```

is equivalent to entering

```
format A:
```

at the DOS prompt. Note, however, that PAN's Load command requires that the filename be fully qualified, including the .COM (or .EXE) extension.

The second IfKey clause is just like the first, except that it handles disks in the B:

FORMAT.PAN • COMPLETE LISTING

```
Load "c:\dos\format.com"
Output "Enter drive, A: or B: "
Label try_again
GetKey
IfKey "Aa"
     Output "A^M^J"
     Go "A:"
     Jump waiter
EndIf
IfKey "Bb"
     Output "B^M^J"
     Go "B:"
     Jump waiter
EndIf
IfKey "[Esc]^C"
     Quit
Else
     Output "^G"
     Jump try_again
EndIf
Label waiter
WaitChild
Quit
```

Fig 2 This script file adds safety features to the DOS FORMAT command, in this case to prevent formatting hard disks

AUSTRALIAN MICRO SYSTEMS
(02) 956 7477

SAMSUNG

AT, 1mb ,40mb , V/C,HDD, EGA Card & Monitor .. $2415
386sx, 2mb, 1.2mb, FDD,40mb,V/C, VGA Cd & Mon $3685
LAPTOP S5600 286 VGA Screen $3499
CALL FOR COMPLETE SAMSUNG RANGE

HARD DISK
CONNER 40mb V/C $699
CONNER 105mb V/C $1195

INTEL
80287-10 ..... $400
80387-sx $590
80387-20 ..... $795
80387-33 ..... $1190

VIDEO SEVEN
VGA 1024I
(1024 x 768) $540
VEGA VGA $399

BEST PRICES FOR PERIPHERALS
ALL PRICES INCL. TAX

ATLANTA BOSS
80386-33 2mb RAM, 64K Cache, VGA (512K), 105mb HDD $5990
80386sx 40mb, V/C, VGA, (Monitor Included) $2990
CALL FOR GOOD PRICES ON 386

NEC MONITORS
3D $965
2A $679

MICROSOFT
Microsoft Word $450
Microsoft Mouse $200
CALL FOR COMPLETE MICROSOFT RANGE
XT ProGold $165
FastBack Plus $189
Laplink III $175
Norton Commander .. $190
Type Quick $78

WORDPERFECT
5.1 ..... $530

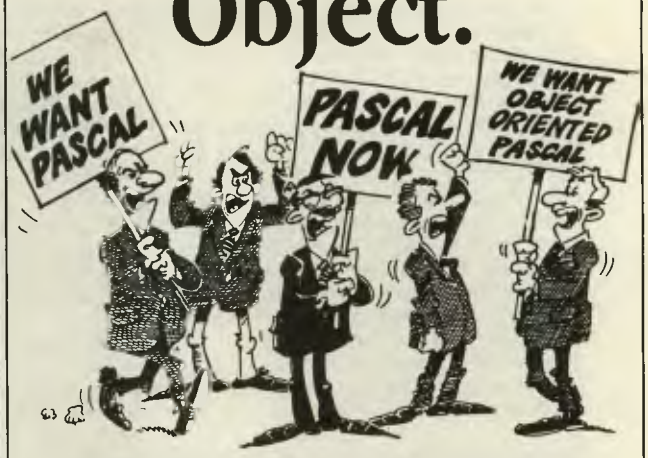
AUTOSKETCH $220
FAST BACK PLUS $195
CALL FOR BEST SOFTWARE PRICES

OKI
Laser 400 ..... $2250
ML390 ..... $825
ML391 ..... $1125
ML183 (15") $460

PANASONIC
KXP1081 ..... $320
KXP1124 ..... $590
KXP1540 ..... $995
CALL FOR TOP PRINTER PRICES

WE MEAN BUSINESS
297 Pacific Hwy, NORTH SYDNEY NSW 2060
PHONE: (02) 956 7477 FAX: (02) 956 7452
ASK FOR OUR SPECIAL PRICE LIST

Programmers Object.



Object Oriented Pascal.

What programmers have been waiting for is here now. Object oriented programming multiplies your productivity! Don't start from scratch! Use Object Professional 1.0, a powerful library of over 200 object types containing over 2000 methods.

POWERFUL USER INTERFACES

The window object types let you use multiple overlapping and resizable windows with mouse support, scroll bars, menus, pick lists, and scrolling data entry screens, plus much more.

OBJECT ORIENTED DATA TOO

Build your programs from proven and documented object types like stacks, linked lists, virtual arrays, and more.

THE IMPOSSIBLE, MADE EASY

System-oriented routines provide; swappable TSR's in only 6K of RAM; DOS and BIOS capabilities; EMS management; keyboard macros; interrupt management; swapping Exec manager, and much more.

COMPLETE DOCUMENTATION, FULL SOURCE

Three volumes of complete documentation, online reference guide, free technical support, and full source code. Object Professional is the successor to the acclaimed Turbo Professional. Price $279.

Turbo Pascal 5.5 is required.
Upgrade from TProf available.

TURBO Power

Call today for more information

MICROWAY

PROGRAMMERS SOFTWARE

292 Chesterville Road, Moorabbin, Vic., 3189
Telephone: (03) 555 4544 Fax (03) 555 9871
BBS: (03) 555 4932 P.O. Box 219 Moorabbin

ADMAR / MW / 09

The PAN command

`Wipe` clears the screen. (This command uses a BIOS function.)

(Note: additional commands may have been added to PAN since this was written. Please check documentation files when you download the program.)

Key strings

A string provided as an argument to the Key or IfKey command contains symbols that identify keys on the standard IBM keyboard. With the IfKey command, the string expresses a list of keys to be matched to the last keypress; the order in which the keys are expressed is immaterial.

The rules for naming keys are as follows:

- Any printable character *except* ^ or [directly represents the key that generates it. The caret (^) and the open square bracket ([) are used as escape characters and must be doubled if intended to stand for themselves. Thus, ^^ signifies a caret and [[a bracket.
- A named key is represented by putting its name in square brackets, for example, [Esc], [Home], [End], [Enter], [Ins], [Del], [PgUp] and [PgDn], and [F1], [F2], [F3], [F4], [F5], [F6], [F7], [F8], [F9] and [F10]. Arrow keys are identified as [Up], [Down], [Left] and [Right].
- Either a regular ASCII or an extended-ASCII code, equivalent to that produced by holding down the Alt key and entering a decimal code on the numeric keypad, can be indicated by putting the appropriate number in square brackets. Thus, for example, as part of an IfKey or Key command, you might enter

```
"[227] generates the pi symbol."
```

- Any character may be prefaced by one or more shift indicators: [Alt], [Ctrl] or [Shift]. Note: the caret may be used as an alternative to [Ctrl].
- Literal control characters should not be included in strings; any that are present will be ignored. So use the ^[*key*] or [Ctrl][*key*] notation instead.

Below are some examples of key names:

`[Alt][F10]`	`Alt-F10`
`[Shift]2`	`@`
`[Esc]`	`Esc`
`^[[`	`Esc`
`[Ctrl][Enter]`	`Ctrl-Enter`
`[3]`	`Ctrl-C`
`^2`	`Null`

This scheme for naming characters makes no pretence of being complete. You cannot enter F11 or F12, for example, or distinguish between the two Enter keys.

Other strings

Strings supplied as arguments to commands such as Screen and Output may contain printable characters (those that directly represent themselves) and control characters that are expressed in the common keyboard-equivalent notation.

Thus, for any suitable X, Ctrl-X is indicated by a caret followed by an X, that is, by ^X. In this notation, a carriage return is ^M and a linefeed is ^J. A literal caret is expressed by doubling the character, that is, by typing ^^.

drive. The third IfKey section handles any other keypresses. If the user presses the Esc key or Ctrl-C (represented by ^C), then PAN just ends and FORMAT never gets started. For all other keypresses the Else clause is performed: PAN outputs a beep (an ASCII Control-G) and returns to the `try_again` label near the top to await another keypress.

Once the FORMAT program has been started, a Jump command causes PAN to continue processing at the label waiter near the end of the script. The WaitChild command instructs PAN to sit back and wait for the FORMAT program (its 'child' in operating-system parlance) to terminate. When FORMAT completes, PAN regains control and performs the Quit command.

To use the FORMAT.PAN script file you would issue the command

```
PAN FORMAT
```

at the DOS prompt. By putting this command into a batch file called FORMAT.BAT, or by setting up an alias and then hiding FORMAT.COM from the

FULL-FEATURED 4-SPEED MODEM

PANTHER MODEMS

2400bps V.22 bis
1200bps V.22
1200/75bps V.23
300bps V.21

FEATURES
- Hayes-compatible auto dial, auto answer, auto disconnect, auto speed ranging
- Manual dialing
- Synchronous and asynchronous
- Dial-up and leased line
- V.23 buffered speed converter
- Low power for continuous operation
- Diagnostics, loopback testing and line monitor speaker
- Ring tool-free (008) for support

Outstanding value. PANTHER modems—the high performance communications link.

$299

SPECIAL OFFER
WHILE STOCKS LAST

UNBEATABLE VALUE

Schmidt Electronic Laboratories
142 Chapel Street St Kilda 3183
Facsimile: (03) 531 9015
Telephone: (03) 531 8011
Toll Free: (008) 33 5086

14 DAY MONEY BACK GUARANTEE

Hayes™ is a registered trademark of Hayes Microcomputer Products Inc.

cormoran/SEL018

MICRO-EDUCATIONAL PTY LTD

256 Darby St, Cooks Hill NSW 2300 Phone (049) 26 4122 Fax (049) 26 2194 Discovery 40 *323#

Australia's Largest Direct Marketer of Computer Products

53¢ DISKS

- 5.25" Double Sided, Double Density
- Lifetime warranty
- Unbranded, plain jackets, no boxes

60c each in 10's, 57c each in 100's, 53c each in 1000's

DOUBLE DENSITY DISKS

CIS brand, best quality disks in Asia. Lifetime warranty.
3.5" DSDD (720K).

1+	$2.00
100+	$1.80
400+	$1.60

5.25" DSDD (360K).

1+	$1.00
100+	$0.90
400+	$0.75

DATA SWITCHES

Allows sharing of peripherals between computers. Sheet metal construction.

Parallel 1 device to 2	$55
Parallel 1 device to 4	$120
Parallel 2 devices to 2	$120
Serial 1 device to 2	$55
Serial 1 device to 4	$110
Serial 2 devices to 2	$110

HIGH DENSITY DISKS

CIS brand, lifetime warranty, great value.
3.5" DSHD (1.44Mb).

1+	$5.00
100+	$4.80
400+	$4.60

5.25" DSHD (1.2Mb).

1+	$2.50
100+	$2.30
400+	$2.00

MAESTRO 2400 XR MODEM

A 2400 (V.22bis), 1200 (V.22) baud modem. Auto-answer, auto-dial, auto-disconnect. Hayes compatible. Synchronous/asynchronous. Compatible with Telecom Discovery (ex. Viatel).

$299

PRINTER RIBBONS

Amust DT-80	$12
Epson MX80/LQ800	$12
Epson MX100/LQ1000	$15
Panasonic KX-P1081	$18
Star NX-1000	$11
Star NL-10	$15
C.Itoh 8510	$12
NEC P3/P7	$15
NEC P5300	$25

CALL FOR RIBBONS NOT LISTED

CALL NOW TO ORDER

We accept Bankcard, Mastercard, and Visa

008 025 229

(FREE CALL)

And we treat you like a Friend-of-the-Family!

Prices include sales tax but exclude delivery. Delivery minimum $5 post, $13 courier. Ask when ordering. All prices subject to change without notice. Errors and omissions excepted.

PARCO® WE LIVE BY OUR TRADEMARK THE SYMBOL OF RELIABILITY

Product Lines

14″ COLOR MONITOR
* Multiscan
* Super VGA
* EGA

14″ MONOCHROME MONITOR
* Dual Mode
* TTL

MOTHER BOARD
* 38633MHz
* 38625MHz
* 386 SX
* 28612MHz

CM-1498

* Dot Pitch: 0.29mm
* Hf: 15.5 - 38KHz
* Vf: 50 - 100Hz
* Resolution: 640 × 480 ~ 800 × 600
* Emulating for 1024 × 768

CM-1496A/B

* Dot Pitch: 0.31mm/0.39mm
* Hf: 31.5 - 38KHz
* Vf: 50 - 85Hz
* Resolution: 640 × 480 800 × 600
* Emulating for 1024 × 768

CM-1488A/B

Dot Pitch: 0.31mm/0.39mm
* Hf: 15.75/21.85KHz
* Vf: 47-63Hz
* Resolution: 640 × 200 640 × 350

Manufacturer & Exporter
PEI CHOW INDUSTRY CO., LTD.

PARCO

TEL: 886-2-5435665, 5652445(REP) FAX: 886-2-5634166
TLX: 27871 PEICHOW P.O. BOX: 55-922 TAIPEI, TAIWAN, R.O.C.

DISTRIBUTORS WANTED

TRY US FOR
- UNBEATABLE PRICE
- SUPERB QUALITY
- EXCELLENT SERVICES

Systems & Boards

8088 - 12MHz

80286 (12 & 16 CPU) & NEAT

80386sx & 80386 - 25/33 Cache

PERIPHERALS

TRUMOUSE, CASE, KEYBOARD, DRIVES, VIDEO CARDS

ADV TECHNOLOGY PTY LTD

9/134 SPRINGVALE RD, SPRINGVALE, VIC
TEL: (03) 562 4855 FAX: (03) 562 3319

123.PAN **COMPLETE LISTING**

```
Load "c:\123\123.exe"
Go ""

* Wait for Lotus 1-2-3 to initialize

WaitScreen 0 75 "READY"

* Draw the menu in reverse video

Video 70
Screen 07 30 /  ┌──────────────────────┐  /
Screen 08 30 /  │ Select a spreadsheet:│  /
Screen 09 30 /  │      1. Expenses     │  /
Screen 10 30 /  │      2. Income       │  /
Screen 11 30 /  │      3. Budget       │  /
Screen 12 30 /  └──────────────────────┘  /

* Get and interpret a keypress

Video 07
Label try_again
Flush
GetKey
IfKey "1"
     * Select File Retrieve <name>
     Key "/frexpenses[Enter]"
     Jump out
EndIf
IfKey "2"
     Key "/frincome[Enter]"
     Jump out
EndIf
IfKey "3"
     Key "/frbudget[Enter]"
     Jump out
EndIf
IfKey "[Esc]"
     * Select: Worksheet Erase Yes to clear the menu
     Key "/wey"
     Jump out
EndIf
Output "^G"
Jump try_again

* Out

Label out
WaitChild
Quit
```

Fig 3 This script adds a customised menu start-up feature to Lotus 1-2-3

directory listing process, you could provide a fair measure of protection against accidental formatting of a hard drive.

Initial menus

The 123.PAN script shown in Fig 3 adds an opening menu to Lotus 1-2-3. I need not discuss this script line by line, but will instead comment only on previously unmentioned PAN features.

WaitScreen tells PAN to wait for a given string to appear on-screen. In this case, it is used to detect the point at which 1-2-3 has completed its initialisation. The Screen command then writes a string on the screen starting at a specified character position, using the video attribute that was set by the Video command.

When presented with the menu, the user presses 1, 2 or 3 to select the corresponding spreadsheet. PAN then feeds 1-2-3 the command to retrieve that spreadsheet and PAN's job is done. By pressing the Esc key while at the menu, the user can start working with 1-2-3 in the usual way; any other keypress produces a beep to indicate an invalid entry. Please note that this PAN script has been tested only with Release 2.01 of 1-2-3.

Looking at Fig 3, you can see that it is possible to use PAN to set up much fancier menus — replete with moving cursor bars and sub-menus, if you wish. Scripts for such menus tend to get rather lengthy, however, so none are listed here. When you download PAN from APC MAGNET, you'll find additional sample scripts, some of which do much fancier jobs than those just described.

You may be able to put PAN to work right away, using some of the scripts in the figures here. Others will require some simple customisation. Even if you have no direct use for these specific scripts, they will serve as good models for developing

EASY TO USE SOFTWARE

ONLY $7.50 EACH

Quality selected Shareware and Public Domain Programs for: Business, Graphics, Games, Kids, Education Word Processing etc.

***5 1/4" Disks $7.50 3 1/2" Disks $10.00**

*Shareware programs require separate payment to Authors if found useful.

The following is a small selection of our more popular Disks, please call / write or fax us for

FREE CATALOGUE

1115 AMULET OF YENDOR One of the most addictive Dungeon & Dragon Games. Super
1401 BRADFORD Print letter quality fonts on Epson MX and FX printers. Impressive.
1497 FORD CAR SIMULATION Test drive , Race various Ford Cars
1370 LIGHTNING PRESS Design and Print Cards, Signs and more! Can be used with 1500 GRAPHIC SET & Disk 1375 below.
1006 EZFORMS Create all types of Forms for Business etc. Includes many Sample Forms.
1359 JET SET 747 Flight Simulator and other games.
1337 TUTOR Excellent tutorial on DOS and Computers for the NEW-computer User, Interactive Learning. A MUST!!
1490 DOS HELP - ON LINE Help reference manual for DOS Outstanding. Easy to Use!! Never forget a DOS Command again.
1073 FUNNELS & BUCKETS Teach Kids arithmetic by playing a space invader type game.
1076 KID GAMES Popular for Kids. Mosaic, Hangman and more....
1358 READ EASY Reading Practice for Grades 1-6.
1269 PROTECT/UNPROTECT UTILITIES Copy over 30 Copy protected programs.
1503 SCRABBLE Try your skills and Vocab. against the Computer
1081 PC-FASTYPE Excellent Touch type Tutor.
1258 POWER MENU Outstanding Menu System. Outstanding Power.
1425 PC-LOTTO Win Lotto, give it a try.
1131 GREATEST ARCADE GAMES Striker, JumpJoe, Flightmare..
1409 VIRUS PROTECTION Flu-Shot+ and other good utilities.
1504 BALLOON SPELLER 3 Great spelling games for kids, excellent
1126 ARCADE SERIES GAMES Kong, Pango, 3-Demon, PC-Golf..
1335 GALAXY Powerful, easy to use Word processor.
1340 MEDLIN ACCOUNTING General Ledger, Accts Payable, Accts Receivable, Payroll etc... Excellent Accounts package.
1508 NINJA Recover Stolen IDOLS Great graphics Keyboard/Joystick
1505 BRANDONS LUNCHBOX 6 Educational games for kids 3 - 7.
1405 AS EASY AS Powerful spreadsheet, Pop Up Menus, Ecellent!
1408 THESAUR PLUS A memory resident on line Thesaurus. H/Disk
1375 ADULT GRAPHICS Can be used with Printmaster, Printshop, First Publisher etc. and our Disk 1370 above (see our 1500 Graphic set).
1460/1461 WORD PERFECT 5 LEARNING SYSTEM **(2 Disks)**
1287/1288 LOTUS LEARNING SYSTEM **(2 Disks)** Great.
1543/4/5/6 PC KEY DRAW Combination CAD and PAINT Program. Flexible and Powerful drawing Package. Graphical Database, Slide shows. CGA 512k and Hard Disk. Extremely Popular. **(4 Disks)**
1485/6/7 PUBLISHING GRAPHICS 1200 Graphics for use with Ventura, Pagemaker, First Publisher, PC Paintbrush, Print Magic (.PCX format) (3 Disks). Also includes conversion utilities!

1500 GRAPHIC SPECIAL

only $28.00 for 4 5 1/4" disks
4 3 1/2" Disks $38.00

Over 1500 GRAPHICS and conversion and printing utilities that can be used with: PRINTMASTER, FIRST PUBLISHER, PRINTSHOP and Disk 1370 above.

ORDER by PHONE, FAX or MAIL NOW!

BRIGHTSPARK

PO Box 253, Morley, WA 6062
Tel. (09) 375-1178 FAX (09) 375-1668

Please send me a FREE Catalogue and the following disks:
#..... #..... #..... #..... #.....
5 1/4" Disks $7.50 **each** - 3 1/2" Disks $10.00 **each** and a 1500 Graphic Set (4 Disks) ☐ 5 1/4" **$28.00** ☐ 3 1/2" **$38.00**
PLUS $3.00 Postage TOTAL $.....
I/WE ENCLOSE PAYMENT BY: Cheque/Money Order BankCard / VISA / Mastercard **EXPIRY DATE** ...../.....
CARD No. | | | | | | | | | | | | | | | | |
Name.....
Address.....
..... Post Code .....
Phone:..... APC5

Tips for creating PAN scripts

Use the Cursor and Output commands with programs, such as DOS utilities, that write their screen output in scrolling (teletype) fashion. Use the Screen command with programs that do full-screen output.

Don't be confused by the differences between *key strings* (used with Key and IfKey) and *character strings* (used with other commands). The latter string style is a standard in programming, but a key string will be new to many people. Remember that a key string identifies a sequence of codes generated by keys on a keyboard, including many for which there are no equivalent characters. In a key string, for example, [Home] serves to identify a single, specific key, while in a character string it represents a six-character sequence of keystrokes.

PAN can be used to run a sequence of programs or one program repeatedly. After one program terminates and PAN regains control with a WaitChild command, another Load and Go can be issued.

If you are animating a large program, you may need to watch the length of your PAN script. The presence of comment lines never hurts, because they are stripped off as the script is loaded. In addition, it never costs to indent commands for readability, because leading white space on a line is also removed.

Ways of reducing memory requirements for a script include keeping labels short (say to two characters), and limiting each field separator to a single character.

scripts of your own, and additional hints are contained in the text box 'Tips for creating PAN scripts'. Users are invited to contribute new scripts, which will be available on APC MAGNET for general distribution.

How PAN works

At least a general understanding of PAN's internal operations will simplify your creation of effective scripts.

The program starts by looking for a command-line argument that names a script file to be used. PAN reads the entire script into memory, compressing it and checking for gross errors (such as invalid commands) in the process. In its internal, compressed form, a script can occupy up to about 60K. This translates roughly into a maximum plain text .PAN script of perhaps 80K, which is surely longer than anyone will require. After loading its script file, PAN begins interpreting the script commands.

When a Load command is encountered, PAN loads the target program into memory above itself. When a Go is issued, PAN relinquishes primary control to the target program, but because it hooks into the timer interrupt, PAN is brought into play 18.2 times each second. Each time PAN kicks in, it performs any pending script commands until it finds one that occasions a delay (such as a Pause command), or until it hits a WaitChild or Quit command. In these latter cases PAN cancels its timer intercept, giving up all control until the target program ends.

It is important for you to understand the difference between the two phases of PAN's operation. In the primary or set-up phase — before it has started a target program running — PAN is the program in control of the PC and can perform any command. In the secondary or background phase, the program that PAN has loaded is in control. In this phase, like a back-seat driver, PAN cannot perform certain commands.

Specifically, since it gains control only during timer interrupts, PAN cannot safely invoke DOS functions. The commands in question are: Go, Load, Output and WaitUntil. If PAN reaches such a command in its background phase, it clears the screen, posts a diagnostic message and solicits a keypress to reboot the system. This error handling is harsh, but there is no simple alternative.

If PAN reaches a Quit command while in its background mode, it holds that command in abeyance until the program terminates. This means that the WaitChild command in Fig 3 is, strictly speaking, not necessary. You need a Waitchild only when PAN is to perform other duties between target-program termination and the point at which PAN itself quits.

There is one command, Key, that has no obvious use in PAN's primary phase, since there is no program (except possibly PAN itself) loaded to read the simulated keyboard input. Nevertheless, there is no prohibition on the use of Key.

Modifications

It would have been possible, of course, to design PAN so that it could execute DOS calls while running in the background. That would have made the program more powerful, but it would also have made it much larger — unsuitably large for this column. Even within this restriction, PAN could be beefed up with many more commands, and it took some self discipline for me to stop adding to PAN's capabilities. It started as a very open-ended project, and adventurous users may choose to extend it for their own purposes.

I do advise considerable caution in doing so, however. In particular, be very careful about what you allow PAN to do inside the timer interrupts. The text box 'Programming notes: extending PAN', provides some further tips for the intrepid souls who want to add extensions.

PAN exhibits some additional limitations imposed by the need to keep it a manageably small project. It is intended for automating text-mode applications and has no facilities for working with graphics. It uses names for keys as they appear on IBM keyboards; some other vendors' keyboards name keys differently. On a few keyboards, for example, the key normally inscribed with Enter is labelled Carriage Return. Also, some cursor keypads have keys marked Page Up and Page Down, but PAN understands only

Programming notes: extending PAN

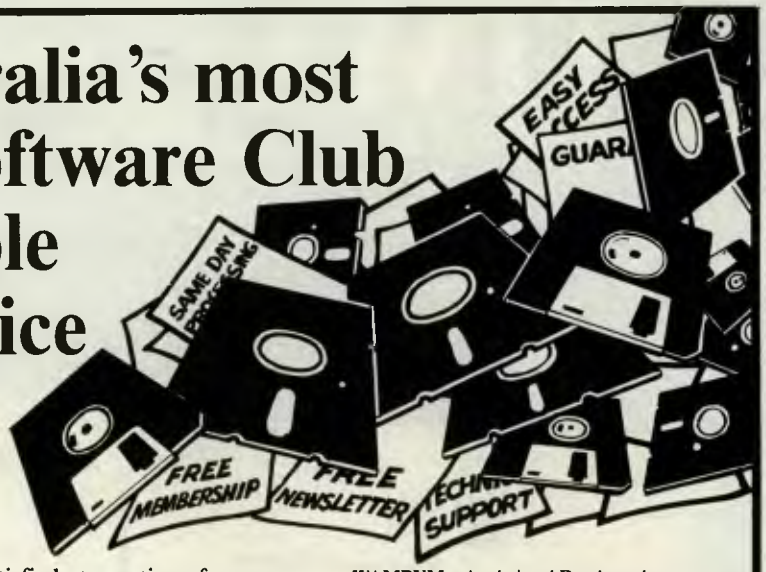
The following text pertains to the assembler listing that is available either by downloading from APC MAGNET or by sending us a floppy disk, as explained on the first page of this article. These are guidelines for adding new commands to PAN.

Implementing a new command requires adding the command keyword to the COMMAND_KEYS table and the name of the associated procedure to the list labelled C_TABLE in the source code. Conditional commands (Ifs, Elses and so on) must be placed in their own sections at the end of the two tables.

The procedure that processes a command must return with AX holding a count of the number ticks to be used for a delay or time-out. If AX is zero (the usual case), PAN processes the next command immediately. If AX is non-zero, then BX must contain a recall address. PAN delays for the designated period and then executes a call to that recall address. If the recall code needs to institute a further delay, it must explicitly store a tick count in the word called TIMEOUT. For an example, study the code for the WaitUntil command (procedure C_WAITUNTIL).

If a command procedure needs to invoke a DOS function, it should be prohibited from executing while PAN is in background mode. The variable PAN_STATE should be tested to determine PAN's current mode. See C_OUTPUT for an example. If you need a fatal-error escape from a command procedure, code a jump to COMMAND_ERROR with SI holding the address of a suitable diagnostic message.

Joining Australia's most innovative Software Club is now a simple matter of choice



Welcome to the Club!
The Choice Marketing Software Club.
If you choose to become a member of our progressive club, just take a look at your exclusive membership benefits:

Free Membership
There are no annual membership renewal fees.

As a member, you need only buy **one** program diskette at our regular low Club price.

You may resign at any time thereafter, or continue to enjoy Club benefits for as long as you wish.

Free Newsletter
We will send you our Club newsletter – "PD SOFT" – free of charge every month.

It covers the software selection of the month, informative reviews, and the latest releases of shareware and public domain programs.

Easy Access
You will have complete access to thousands of good quality software programs at the cost of $12 per disk, plus $3 postage and handling charges.

The $12 covers duplication costs, advertising, upkeep of library, computer equipment, newsletter, and staff wages.

Some of the software in the library is subject to additional registration fees payable to the author for regular usage of their programs.

That is, if you want to keep and regularly use the program, you pay the registration fees.

If you don't, you may still keep the program or pass it on to a friend or colleague.

The Choice Marketing Guarantee
Our Guarantee states: "If you are dissatisfied at any time, for any reason (or no reason at all) you may return any Choice Marketing product for a full refund or replacement."

Same Day Processing
All orders received are processed on the same day.

That means you no longer have to wait weeks for your order to reach you.

Technical Support
Should you ever need help, we will try our very best to be of assistance.

CHOOSE ANY 3 PROGRAMS FOR ONLY $19!
The following software programs are for IBM-PC and compatible computers only:

FINANCE MANAGER II – A Personal or Small Business Financial Management Program. (#B2 1071)

BOYAN D3 – Full-featured Communication Program. (#CC 1013)

WAMPUM – A relational Database that acts/works pretty much like dBase. (#DB 1024)

POWER MENU – A Menu Program that acts as a "Super Highway", providing easy access to any application in your PC. (#DM 1016)

ANIMALS – A Clip Arts Collection of Eagle, Lion, Monkey, Tiger & more in PCX and PFS format. (#DP 1013)

4DOS – Provides enhancement for most of the DOS commands and 30 more new commands making DOS more bearable. (#DU 1031)

FAST TYPE – Typing Tutor that helps you master the keyboard. (#ED 1009)

PIANOMAN – Turns keyboard into a piano records and plays back. Simulates multi-note chords. (#EN 1003)

CHOICE GAMES #1 – Includes Catch Em, Mind, Robots from Hell, Hong Kong Mahjong & Pyramid. Required VGA. (#GA 1034)

AS EASY AS – Looks, acts like Lotus 1-2-3. (#SP 1016)

GALAXY – A powerful, easy-to-use word processor that is Word Star compatible. (#WP 1013)

CHOICE MARKETING

13 Knightsbridge Way
THORNLIE WA 6108
PO Box 280
MADDINGTON WA 6109
Telephone: (09) 459 8894
Facsimile: (09) 493 2726

FREE POST A13 CHOICE MARKETING SOFTWARE CLUB
P.O. BOX 280 MADDINGTON WA 6109

Yes! Please accept my application for membership in the Choice Marketing Software Club. Send me 3 programs whose numbers I have indicated in the boxes and my FREE Membership for only $19.00 plus $3.00 postage and handling (for 3.5" diskettes please add $10.00).

I wish to receive the 3 selections marked in the boxes provided:

Diskette size ☐ 5¼ ☐ 3½

Surname: ..... **First Name:** .....

Company .....

Address: .....

Suburb: ..... **State:** ..... **Postcode** .....

Enclosed please find my payment as follows: Cheque/Money Order/or please charge Visa/Bankcard/Mastercard.

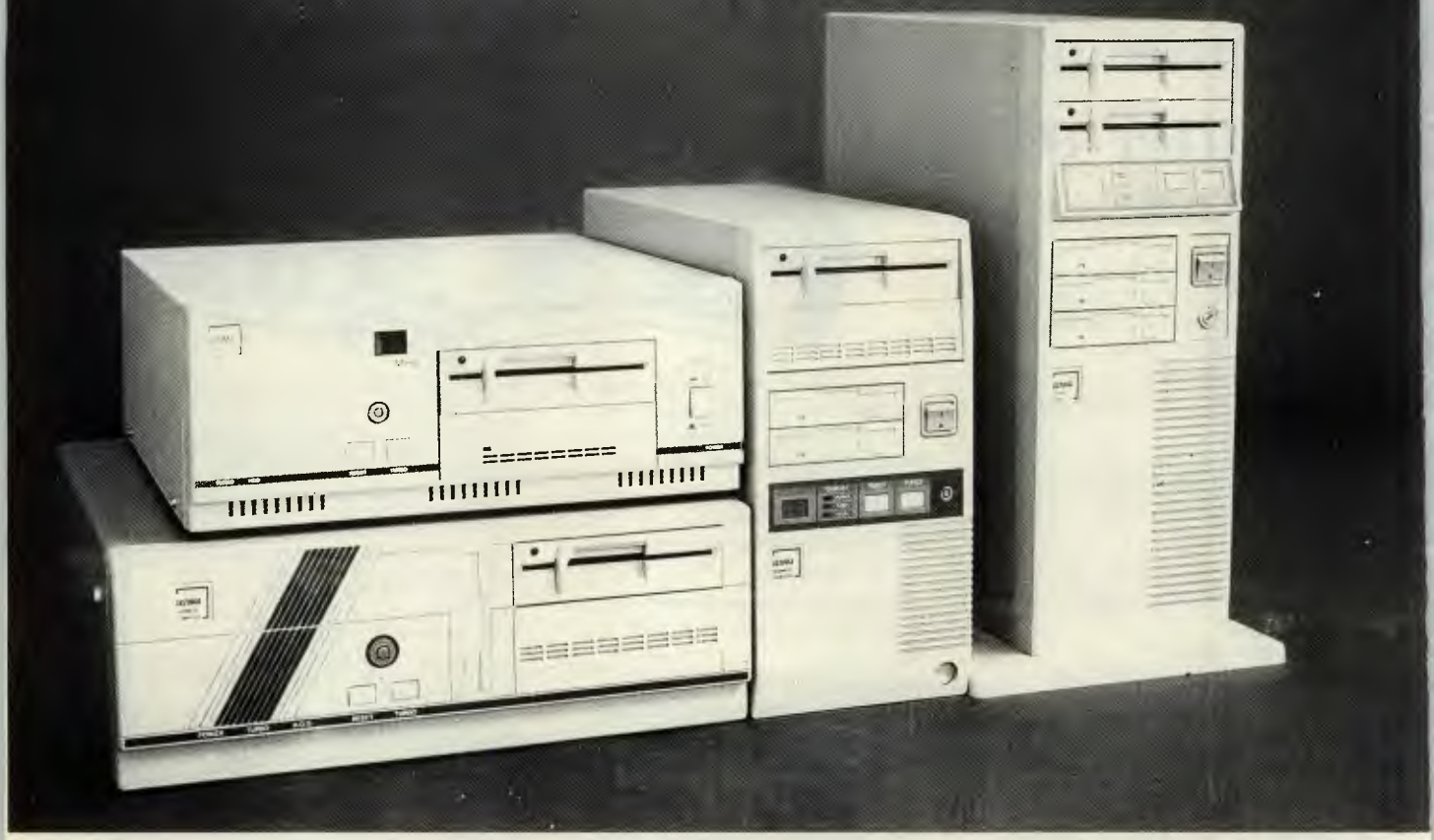
Card No: ☐☐☐☐ Expiry Date: .....

SIGNATURE (If under 18 parent must sign).

AD IMPACT CHOICES27

ULTIMA COMPUTERS

OUTSTANDING RELIABILITY AND PERFORMANCE



1. ULTIMA XT PERSONAL COMPUTER SYSTEM

- 4.77/10MHz TURBO SWITCHABLE
- 640K RAM ON BOARD
- 1 X 360KB FLOPPY DRIVE
- CLOCK, SERIAL, PARALLEL, GAMES & DISK DRIVE PORT
- 20MB HARDDISK (40ms)
- ENHANCED 101 KEYS KEYBOARD

2. ULTIMA AT-286HS ADVANCED COMPUTER SYSTEM

- 6/12MHz TURBO SWITCHABLE
- 1MB RAM ON BOARD
- 1 X 1.2MB FLOPPY DRIVE
- SERIAL, PARALLEL AND GAMES PORT
- 20MB HARDDISK (40ms)
- ENHANCED 101 KEYS KEYBOARD

3. ULTIMA 386SX 16 MINI COMPUTER SYSTEM

- 16/8MHz TURBO SWITCHABLE
- 1MB RAM ON BOARD
- 1 X 1.2MB FLOPPY DRIVE
- 2 SERIAL & 1 PARALLEL PORT
- 42MB VOICE COIL HARDDISK (28ms)
- ENHANCED 101 KEYS KEYBOARD

4. ULTIMA 386DX-33 PROFESSIONAL COMPUTER SYSTEM

- INTEL 33MHz 386 CPU (LANDMARK TEST: 58.7)
- 4MB RAM ON BOARD
- 1 X 1.2 MB FLOPPY DRIVE
- 2 SERIAL & 1 PARALLEL PORT
- 71MB VOICE COIL HARDDISK (25ms)
- ENHANCED 101 KEYS KEYBOARD

** ALL ULTIMA COMPUTER SYSTEMS WITH

- 12 MONTHS PARTS & LABOUR WARRANTY
- MS-DOS 4.01 & GWBASIC
- SYSTEM & USER MANUAL
- STYLISH METAL CASE WITH EXPORT PACKAGE
- UNDERGO 24 HRS BURN-IN TESTING PROCEDURE
- FULLY IMPORTED FROM TAIWAN

Ultima Model	Ultima XT-10	Ultima 286HS	Ultima 386SX-16	Ultima 386DX-33
	$	$	$	$
MONO	1195	1650	2450	4750
EGA	1745	2200	3000	5300
VGA	1820	2275	3075	5375
NEC 2A	1920	2375	3175	5475

AUSTRALIAN BUDGET COMPUTERS

982 VICTORIA ROAD, WEST RYDE 2114
TELEPHONE: (02) 808 3557 (02) 807 3621
FAX: (02) 807 1159

DEALER ENQUIRIES WELCOME

PgUp and PgDn. I have not included support for the F11 and F12 keys, both because they are not widely used and because their inclusion would add disproportionately to the size of the program. A complete list of valid key names is given in the 'PAN command set' text box.

One final note: PAN uses an undocumented option of the DOS Execute-A-Program function (interrupt 21, function 4B) to load a program without executing it.

EN

Downloading from APC MAGNET

The programs published in *APC* are available by modem from APC MAGNET (1200bps, 8 data bits, no parity, full duplex).

APC MAGNET is accessed through the Discovery 80 system. If you are not already a Discovery subscriber, call 008 033 342 during business hours.

To download the productivity program from the current issue of *APC*, connect to APC MAGNET by making the appropriate selections from the Discovery menus. Once in APC MAGNET, select 'Australian Personal Computer' and 'Productivity'. Choose option 3 (download a file), specify ASCII or Binary (executable programs are binary, source codes are ASCII) as appropriate, and then choose the file to be downloaded. Start downloading when APC MAGNET tells you it is ready to go.

Although binary files (eg, .EXE and .COM) are ready-to-run, you will need to delete the system header from text files before attempting to use them.

There are no additional charges for using APC MAGNET, although normal Discovery charges apply (20c/min plus 6c/kilocharacter during peak hours; 15c/min plus 4c/kilocharacter off-peak).

These programs can be copied but are copyrighted and are made available only for non-commercial use. You may make copies for others as long as no charge is involved, but making copies for any commercial purpose is prohibited.

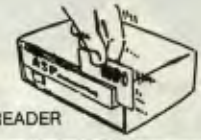
BARCODE READERS

ASP's AUSTRALIAN designed and built BARCODE READER connects between the keyboard and IBM PC/XT/AT or clones.

Scanning a barcode tricks the PC into thinking the scanned character has been typed on the keyboard. No more software hassles!

Including WAND/2000 $649.*

ASP also makes RS232 & PORTABLE BARCODE READERS, ZIPCARD & MAGNETIC STRIPE READERS & LABEL PRINTING SOFTWARE.



ZIPCARD READER

Another product, the NETWORK BARCODE TERMINAL, is designed for "hostile" environments. It collects barcode, magnetic stripe and keyboard input from up to 31 terminals, and feeds it into 1 PC. All data collection is automated.

May replace time clocks, track factory production and much more.

Dealer and OEM enquiries welcome.

NOTE NEW ADDRESS & PHONE
736 WAVERLEY RD
CHADSTONE 3148

asp microcomputers
(03) 568 0988
FAX
(03) 568 0954

* Retail Excluding Sales Tax

PORTABLE BARCODE READER

ASP's AUSTRALIAN designed and built PORTABLE BARCODE READER lets you scan barcodes and type in numeric data ANYWHERE.

The reader is powered by built-in batteries, and uses a barcode wand or gun for input to the unit's large 32K RAM.

Security RAM back-up ensures your data is kept for up to 5 years, even with the unit turned off.

Back home just connect the Home Base (supplied) for automatic recharging and data downloading, using your choice of RS232 or keyboard emulation.

It can also be used as a fixed unit (like our standard barcode readers) saving the expense of an additional unit.

Includes low power consumption push button ASP WAND/2000 and manual. $955 (excluding sales tax)

Custom programming available.

DEALER AND OEM ENQUIRIES WELCOME.

736 Waverley Road,
Chadstone 3148
Tel: (03) 568 0988
Fax: (03) 568 0954

asp microcomputers

ATTENTION DEALERS!
JUST ARRIVED!

MEMORY EXPANSION MODULES

AT PRICES THAT'LL SURPRISE YOU.

A WIDE RANGE OF SURFACE MOUNTED SIMM AND SIP MODULES AVAILABLE EX-STOCK.

256k x 9 100NS	1M x 8 100NS	1M x 9	70NS*
256k x 9 80NS*	1M x 8 80NS	1M x 9	60NS*
256k x 9 70NS*	1M x 9 100NS*	4M x 8	80NS
256k x 9 60NS*	1M x 9 80NS*	4M x 9	80NS

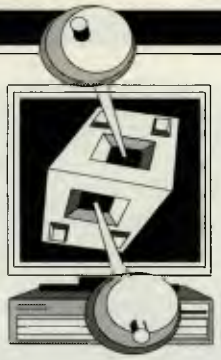
* Also available in static column configuration.

CALL NOW FOR DETAILS!

NJS ELECTRONICS

Melbourne (03) 887 0577
Sydney (02) 956 3820
Brisbane (07) 262 6664

FULL 1 YEAR EXCHANGE WARRANTY



Don Trivette clubs his way through six pre-histerical events and beats his friends to the Caves Of Fame; while on a more serious note, Michael Aitken resets the stage for the air confrontation of the century.

The Caveman Ugh-lympics

Computers: IBM, Commodore
Distributor: Electronic Arts
Price: $29.95

Imagine Fred Flintstone and Barney Rubble in the Olympics and you have a good idea of what Electronic Arts' The Caveman Ugh-lympics looks like. Computer store shelves sag under the weight of sports simulations — baseball, football and basketball to name a few — and most of them are pretty difficult to tell apart. Ugh-lympics is truly original, however, and it deserves a closer look.

There aren't any troglodyte athletes left to promote this whimsical poke at the Olympic games, but its sheer originality more than makes up for the lack of a celebrity endorsement.

You and up to six of your hairy-footed friends compete in events that are as extinct as the Mesozoic era. But first you must pick a character to represent your athletic prowess. Possibilities range from Glunk, a master of the ancient art of Club-Fu, to Crudla, who practices at home by clubbing her husband. (Hint: Gronk obviously eats Wheaties, but Vincent couldn't spread warm butter.)

Once you select an identity, the games begin. First comes the Mate Toss, an Ugh-lympic event designed to show your affection for the opposite sex. Grab your mate by the hair, swing her (or him) in a circle, and then let go. The faster you swing, the further he or she travels before finally bouncing down. If you want to see a really ecstatic mate, toss him or her at least 20 metres.

The Saber Race is a straightforward foot race against a sabertooth tiger. Unfortunately, sportsmanship among the Neanderthals is unknown. If your fellow competitor overtakes you, he'll grab your loin cloth and toss you to the big kitty. If you are eaten, you lose.

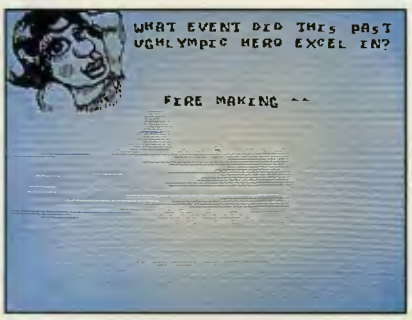
The third event is Fire Making, my favourite. No Zippos allowed: you must rub two sticks together until you get the tiniest whiff of smoke and then blow like Hurricane Hugo. (Hint: if your opponent is getting ahead of you, whack him on the head.) The next event is Clubbing. Nothing special here: this looks just like pro wrestling on TV.

The Dinosaur Race and Dinosaur Vault are the last two events. In the race you guide your reptilian steed through an obstacle course — not an easy task for a critter with a brain the size of a pea. In the dino vault . . . well, guess what happens if you come up short? (Don't let anyone tell you that dinosaurs were vegetarians.) Points are awarded for each event and the winner gets to record his name in the caves of fame.

Caveman Ugh-lympics is one of the wittiest games to come along in some time. The expressions on the faces of the prehistoric contenders will leave you rolling on the floor, and there's a surprise at every turn. If you swing your mate too long, for example, you'll turn red in the face and throw up.

The graphics and animation are original, crisp and appropriate to the Neanderthal age. My only criticism is that the action is so fast and furious, joysticks easily lose their calibration; the game needs a pop-up calibration routine.

Don Trivette



Custom Keyboards

POZ Customer Display

Bar Code and Card Readers

Cash Drawer

Unique Micro Design Pty Ltd
Unit 2/23 Wadhurst Drive
BORONIA VIC 3155
Tel: (03) 887 1022 Fax: (03) 887 0734
POZ-10

Their Finest Hour: The Battle of Britain

Computers: IBM/Tandy
Distributor: Ozisoft
Price: $69.95

'Never has so much been owed by so many to so few' — *Winston Churchill.*

'He must have been thinking of our liquor bills' — unidentified RAF pilot, from *Their Finest Hour Manual.*

Their Finest Hour is (yet) another game built on a flight simulator. It is set in the fateful summer of 1940, when the German air-force tried to win control of the skies over England as a prelude to invasion. You can fly fighter and/or bombing missions for either side, in any of the major planes of the conflict.

I began in a Spitfire (where else?) and chose the first of eight scenarios. After being shot down a few times and generally not contributing to the war effort, I spent a much-needed half hour with the manual. In any case, there is no need to jump in at the deep end — the game has a series of training flights, where you have unlimited ammunition in a sky full of enemies who don't want to shoot you.

Their Finest Hour offers many degrees of difficulty. Opposing pilots can range from novices through to top aces. (Novices are handy opponents while earning your wings.)

The game's action is fast and absorbing. You need to fly very close to the enemy to do any damage — the fighters of that era were little more than flying machine guns. Therefore, fighters tend to spend most of their time trying to get behind other planes, and shaking people off their tails. Bombers are easier to hit, but harder to approach. The action is immediate — you see your machine gun fire, and it's easy to tell if you're scoring hits. This close-up aspect makes *Their Finest Hour* a welcome contrast to other air combat games, where you use auto-selection and auto-aim to fire missiles at planes you usually track only on radar.

The program's book is excellent. It deals with the mechanics of the game in about 20 pages, and details the historical background of the Battle of Britain, the people who fought in it, the planes they used and the fundamentals of flying. The material is well written, and full of anecdotes and technical details for the aficionado. [*I learnt that Stuka dive bombers had sirens mounted on their landing gear to cheer up the people on the ground*].

The manual saves you learning through bitter experience that a tight turn is the Hurricane's only defence against a Bf 109 on its tail. Bf 109 pilots have it easier — they can always dive out of trouble. Handy to know, because when your opponents are flying at ace level, it doesn't take them long to get you in their

It's new, it's affordable, and it's upgradeable to PostScript!

The microLaser™

from TEXAS INSTRUMENTS

Buy the standard microlaser now for only

$2790.00

Ex Tax. R.R.P.

and then upgrade to Adobe PostScript™ yourself — without tools or service technicians!

THE POWER OF POSTSCRIPT from $4,900 Ex Tax. R.R.P.

AVAILABLE FROM THE FOLLOWING AUTHORISED DEALERS ...

VICTORIA

INVOTEK
Sth. Caulfield Ph: (03) 563 5556

J.G.B. COMPUTER SYSTEMS
Frankston Ph: (03) 781 2488

COMPUBIZ PTY LTD
Brunswick Ph: (03) 388 0777

EXECUTIVE EXCELLENCE P/L
Blackburn Ph: (03) 877 2208

BLUE CHIP ELECTRONICS
Carlton Ph: (03) 663 7764
Moorabbin Ph: (03) 553 4488
Ringwood Ph: (03) 870 2243

NEW SOUTH WALES

AVO ELECTRONICS SYSTEMS
St. Leonards Ph: (02) 906 2655

STOCK MANAGEMENT SYSTEMS
Green Point Ph: (018) 278 095

SABRE COMPUTER CORP.
Wagga Wagga Ph: (069) 214 310

BLUE CHIP ELECTRONICS
Broadway Ph: (02) 281 1044
Crows Nest Ph: (02) 436 3655
Wollongong Ph: (042) 263 200

SOUTH AUSTRALIA

BLUE CHIP ELECTRONICS
Adelaide Ph: (08) 232 2555

QUEENSLAND

BLUE CHIP ELECTRONICS
Kelvin Grove Ph: (07) 356 7722

WESTERN AUSTRALIA

BLUE CHIP ELECTRONICS
Perth Ph: (09) 227 5511

AUSTRALIAN CAPITAL TERRITORY

BLUE CHIP ELECTRONICS
Fyschwick Ph: (062) 807 833

TASMANIA

MASTER BUSINESS SYSTEMS
Rosny Park Ph: (002) 447 611

DISTRIBUTED BY EASTERN MICRO ELECTRONICS ...

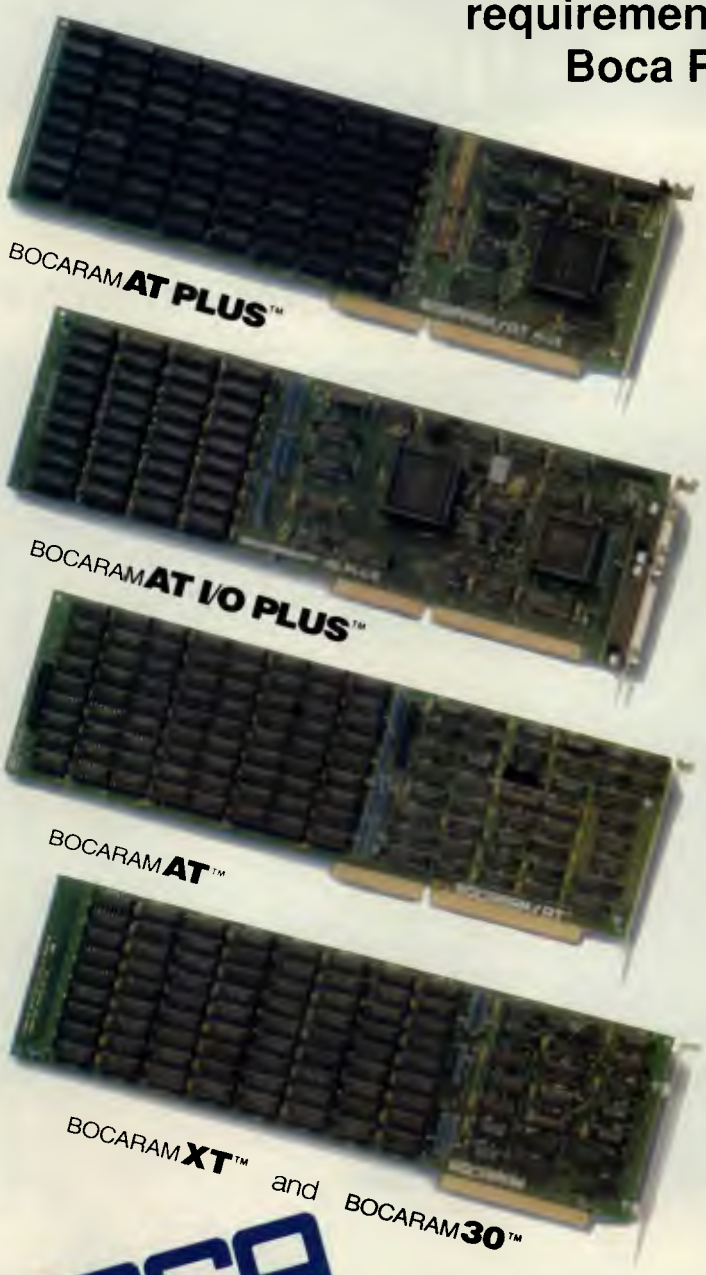
MELBOURNE Ph: (03) 699 3088 **ADELAIDE** Ph: (08) 234 2100 **SYDNEY** Ph: (02) 313 6244 **BRISBANE** Ph: (07) 356 9988

ALSO AVAILABLE IN MICRO-CHANNEL

Solutions.

ALL BOARDS GUARANTEED BY FULL FIVE YEAR WARRANTY

Whatever your system and whatever your memory requirement, the industry agrees that Boca Research has *the* solution.



BOCARAM/AT PLUS — *"...an excellent solution for today's AT bus...."*
—Byron Druss, Product Manager, Robec Distributors

- User-upgradable to 8MB with 1Mb DIPs
- Supports DOS, OS/2, Unix, and Xenix operation systems; LIM/EMS 4.0 compatible
- ISA (AT) bus compatibility guaranteed at any CPU speed
- Product No. BRAT80 **$998**.inc tax with 2Mb RAM

BOCARAM/AT I/O PLUS — *"The perfect extension to the BOCARAM/AT PLUS...excellent for any CPU speed."*
—Lou Reda, VP/Operations, Chevco Computing Co.

- User-upgradable to 4MB with 1Mb DIPs
- Two serial ports and one parallel port
- Supports DOS, OS/2, Unix, and Xenix operating systems; LIM/EMS 4.0 compatible
- ISA (AT) bus compatibility for any CPU speed
- Product No. BRATP0 **$1088**. inc tax with 2Mb RAM

BOCARAM/AT — *"The engineering, design, and manufacturing quality of the Boca boards rate as top-notch."*
—PC Magazine

- User-upgradable to 4MB with 256K DIPs
- Supports DOS, OS/2, and LIM/EMS
- ISA (AT) bus compatible
- Product No. BRAT00 **$1088**. inc tax with 2Mb RAM

BOCARAM/XT and **BOCARAM/30** — *"Best value among XT boards for budget-minded users."*
—InfoWorld

- User-upgradable to 2MB with 256K DIPs
- Supports Lotus/Intel/Microsoft EMS
- ISA (8-bit) bus compatible
- Product No. BRXT00 (PC/XTs) **$998**.inc with 2Mb RAM
- Product No. BR3000 (Models 25/30) **$998** " "

BOCA RESEARCH INC

Distributed in Australia by

High Technology COMMUNICATIONS PTY LTD

BOCARAM/AT PLUS, BOCARAM/AT I/O PLUS, BOCARAM/AT, BOCARAM/XT, and BOCARAM/30 are trademarks of Boca Research, Inc. All other references to computer systems, software, and peripherals use trademarks owned by their respective manufacturers.
© Copyright 1989 Boca Research, Inc.

28 McEvoy Street, Waterloo, NSW 2017 PO Box 212 Waterloo, NSW 2017
Telephone: (02) 690 1233 Facsimile: (02) 698 5484

sights. The machines moved fast — up to 400mph — and the game reflects this with a high emphasis on speed. The famous 'they came out of the sun' tactic is supported: if you dive on enemy planes with the sun behind you they won't see you until you open fire.

Their Finest Hour does not have all the features desired by a true flight simulator fanatic. While it offers planes with normal controls for take-off, flight and landing, the flying environment is static — there is no cloud, no night flying, no hills or significant ground features, and the sun is always high. That said, however, the contains a good mix of playability and authenticity. In some scenarios you take off as bombers approach your airfield and in others you step into the cockpit at 10,000 feet. You can land the plane if you choose (remembering flaps and landing gear, etc), or you can quit out at any time (though you lose the plane if you're not in over-friendly territory).

And if it's not hard enough just to survive in the skies, the game also scores how well you followed mission orders. If your mission is to protect bombers, for example, you don't get an Iron Cross for chasing a Spitfire, or running out of ammunition before the bombers reach their target. The better your squadron performs, the more points you get. But the game is flexible — there's no penalty for ignoring priorities.

Their Finest Hour packs a number of features to broaden its appeal. You can adopt an identity as a pilot, and work your way up through the ranks — if you survive; and you can people your missions with invented crews, though you're not necessarily doing them a favour. As in the actual battle, I found that a good many pilots' careers were cut short.

The game's great strength is as a vehicle for flying missions. It's at its best when you're closing in on a bomber with a fighter on your tail, and the sky is weave of dogfighting planes.

If you tire of the many predefined missions, you can design your own, and not only can you fly them, but the program also has a 'video' option, which allows you to record any flight sequence and play it back as video film. You can view current or saved clips from a range of angles using a screen-based 'video editor'.

Their Finest Hour will run with 512K, but it will make full use of 640K. The designers recommend giving it maximum available memory. It supports CGA, but colour is very limited, and in the CGA sky it's like flying with a windscreen covered in oil — not recommended. (An added danger here is that it's hard to identify the planes.) The scenery was seamless at 20MHz, and a little sluggish at 8MHz. The game has switches to allow suppression of ground detail, which it suggests for slower machines. Joysticks and mice are supported, and desirable. Ad Lib music cards are also supported.

The game's paper-based copy protection is clever, if a little annoying. It asks you to 'tune your radio' (using a cypher card) rather too often.

Their Finest Hour is well presented and excellent to play. If you're tempted to refly the Battle of Britain, this game is a great way to do it. You can play in short bursts, or settle into the cockpit and campaign. If games were rated on how late you play when you have to start work at nine, this one gets a 3.00am.

Michael Aitken

END

Archcom...The No.1

DEALER ENQUIRIES WELCOME

With our computers you get a deal you can't refuse. They are packed with features that save; save on desk space, save time and save you money.

Special features

All 286 systems are New Enhanced AT (NEAT).
The CAT-105 keyboard (eats the mouse alive) simulates mouse movement on the keyboard.
Front panel timer on the case will tell how long an operation has run - the timer can be reset.

Basic configurations

VGA card, 42M v/c hard disk, I/O 2S1P1G, 200W Power Supply, 1.2 FDD, CAT-105 keyboard.
12 months parts and labour warranty on our products.

SERVICE/SUPPORT

We are importers & distributors of computer components. Our stock has a wide variety of cases, mother boards, keyboards, cards drives, RAM chips and hard disks. We would like to serve your needs with the best possible price.

ARCHCOM 286 NEAT-20 system
Landmark speed 26MHz
1M RAM expandable to 4M on board
$ 2100 inc. Tax

ARCHCOM 386 Cache64K-25 system
Landmark speed 42MHz,
64K Cache RAM
2M RAM expandable to16M
8M on board
$ 3952 inc. Tax

ARCHCOM P/L
813A Princes Hwy, TEMPE 2044
Tel: (02) 558-4823 Fax: (02) 558-4885
OPEN SEVEN DAYS

- We accept Bankcard, Mastercard & Visa
- Freight & Insurance: $9.00 Post , $13.00 Courier
- Call for products not listed
- Government & Corporate enquiries welcome
- Dealer enquiries welcome
- Phone And Mail Orders Welcomed

VAPORWARE

Unit 1A • 28 Victoria Street • Smithfield • NSW 2164

MONTHLY SPECIALS

MACE 1990
New Version
$160.00 NEW

Procom Plus
Buy 5 get 1
HOT WIRE
File Transfer Software
FREE

MICROSOFT

QuickC/Assembler	$275	Windows 286	$139
QuickC 2.0	$132	Mouse/Windows 286	$295
QuickBasic 4.5	$132	Flight Simulator 4.0	$79
QuickPascal	$140	WORD 5.0	$475
MacroAssembler 5.1	$205	EXCEL Spreadsheet	$575
MOUSE (Bus or Serial)	$215	Works	$210

LabelWriter
an office must
$475.00

PROJECT CALC
$199.00

COMPUTER BOOKS

WordPerfect 5 : The Complete Reference	$46.50
Turbo Pascal 5.5: The Complete Reference	$49.50
DOS : The Complete Reference (2nd edition)	$47.50
dBASE III+ : The Complete Reference	$49.50
The ABC's of dBASE IV	$39.50
dBXL and QuickSilver Programming	$45.50
Programming in Clipper (2nd ed)	$52.50
1-2-3 Release 3.0 : The Complete Reference	$50.50
1-2-3 : Made Easy or DOS 4 : Made Easy	ea $35.50
Using Quick C 2.0 or Using QuickBasic	ea $36.50
Using Turbo C 2.0 or Using Turbo Pascal 5	ea $39.50
Advanced QuickC or Advanced Turbo C	ea $39.50
Word 5:Made Easy or WordPerfect 5:Made Easy	ea $35.50
Using EXCEL for PC or Advanced EXCEL for PC	ea $39.50
Using QUATTRO PROFESSIONAL or DESQVIEW	**ea $45.50**
Using Microsoft Word for Windows	**$42.50**
Mastering AUTOCAD (Release 10)	**$52.50**
The ABC's of AUTOCAD (Release 10)	$40.50
The Official Book of King's Quest	**$20.50**
Inside the IBM PC AT	$44.50
V.I.R.U.S. Protection (With FREE Software)	**$75.00**
Ventura by Example by David Webster	$48.50
Mastering VENTURA 2.0	**$42.50**
Mastering the Norton Utilities	$42.50
The Paul Mace Guide to Data Recovery	**$42.50**

COMMUNICATIONS

Brooklyn Bridge (Serial or Parallel)	$110
Brooklyn Bridge Universal	$185
Carbon Copy Plus V5.2(while Stocks Last)	$210
Procomm Plus	$115
LapLink Release 3	$190
Mirror III	$120
PC Anywhere III	$185

DATABASE

C lipper *(FREE Upgrade to Ver 5)*	$789
D B X L Ver 1.3	$279
dBASE III Plus	$875
dBASE Stats	$635
dBFAST / PLUS (dBASE Compiler)	**$431**
dBFAST / Windows (dBASE Compiler)	$475
(dBASE III Plus for MicroSoft Windows) NEW	
FOXPRO	$CALL
Quicksilver Compiler Ver 1.3	$750

SPREADSHEETS

LOTUS 1-2-3 Release 2.2	$655
LOTUS 1-2-3 Release 3	$755
LOTUS 1-2-3 Network Server	$850
VP Planner Plus 3D NEW	**$495**
QUATTRO *Professional*	$560
Symphony (with FREE Allways)	$Call

LOTUS ADD-ONS

101 Macros for EXCEL, 1-2-3, Symphony, WordPerfect & more	ea $89
3-2-1 Blastoff *(Accelerator & Security)*	$179
3-2-1 Gosub *(Write your own @ Functions)*	$189
COMPILE 1 To C (Spreadsheet Compiler)	$439
Individual Training for Lotus-123	$99
SeeMORE	$120
Sideways	$89
ProjectCalc *(Project Manager for Lotus)*	$199
What-if Analyst *(Release 3 compatible)*	$99

UTILITIES

Above Disc Version 3.1	$170
Check-it! with FREE Mace Vaccine	$95
Copy II PC Ver. 5.0	$50
Copywrite	$135
Deluxe Option Board *(New V5.4)*	$250
DESQview 2.25	$175
DESQview 386 *(INCLUDES QEMM)*	$250
DESQview Companion	$125
Disk Technician Advanced	$249
Fastback Plus 2.1	$180
FormTool *includes FREE Print Preview*	$175
Formworx	$150
Flowcharting II+	$310
HYPERPAD NEW	$135
MACE Utilities 1990 Edition	$160
Norton Editor	$105
Norton Commander 3.0	$190
Norton Utilities Advanced Ver 4.5	$169

Ph (02) 725 3700 • Fax (02) 604 1983

DESKTOP PUBLISHING

Corel Draw Version 1.1	$825
Draw Partner	$120
Harvard Graphics *(Free Computer Book)*	$540
NewsMaster II	$120
PFS First Publisher V2.0	$170
PrintMaster Plus	$99
Ventura Publisher ver 2.0	$1090
Ventura Stylesheets (Book + Disk)	ea $59

Select from "Newsletters" or "Technical Documents". & "Business Documents"

WORD PROCESSING

Individual Training for WordPerfect	$99
Gram•mat•ik IV *(Style Checker)*	$135
Legal or Medical Spell Dictionary	ea $99
Microsoft WORD 5.0	$475
MultiMate V4	$648
PFS First Choice 3	$188
Typing Instructor Encore	$ 99
Wordstar Professional 5.5	$385
WORDPERFECT 5.1	$595

PC Tools Deluxe 6.0	ONLY $205
PrintQ Version 4.0	$169
QEMM 386 Ver 5.0 *Inc Free MANIFEST*	$135
QRAM Ver 1.0 *Inc Free MANIFEST*	$100
QDOS II *(now supports DOS 4)*	$105
Sidekick Plus	$240
Spinrite II NEW	$175
X-Tree Professional	$140
X-Tree Gold Edition	$175
X-Tree NET *(Novell Compatible)*	$399

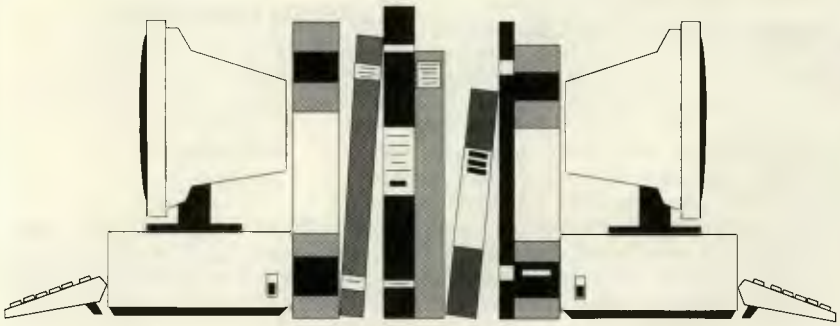
Ventura 2.0
Profesional Extension
$495

Word for Windows
New from Microsoft
$535

ALL NEW
Quarterdeck range.
$CALL

All products are subject to availability and Prices are subject to change without notice. All purchases subject to HALLDALE Terms and conditions.

E.&O.E. APC 05/90 Prepared 20/04/90



Baffled by the manual accompanying your integrated package? One of these books may increase your productivity.

Getting it together

Using PFS:First Choice, Release 3

Author: Gail Todd
Publisher: Osborne/McGraw Hill
ISBN: 0-07-881521-5
Price: $47.95

Using PFS:First Choice is an entry level integrated package providing the three 'core' business applications — word processing, spreadsheet and database — and the now fairly standard extra capabilities of graphing, slide show generation and telecommunications.

Five main parts, each of three or four separate chapters, cover word processing, spreadsheets, databases, integrated working between applications and 'Telecommunicating'. Slide shows are covered under word processing, and graphs as an aspect of spreadsheets. Two appendixes cover 'Working with Printers' and 'Working with Directories'.

Each part gives a careful, step-by-step introduction to the functions it covers. In Part 2, 'Spreadsheets', the chapter on graphing is particularly good and Part 3, 'Databases', gives a good account of table and form views, basic sorting and searching, and report generation. Part 4, 'First Choice as Integrated Software', is also good, covering form letters, mailmerge and the transfer of material between modules.

Part 5, 'Telecommunicating', seems to have received the poorest coverage. Elsewhere, excellent use is made of screen dumps to illustrate the text, but there is room to include more.

The book is well structured, well written and well produced. The Table of Contents and Index are excellent. Brief in-text notes make many worthwhile points without disrupting the main flow of the material.

A tear out command reference card is included but I would like to have seen more reference material, for example, a menu map, a statement of program limits and a summary of the differences between Release 3 and previous versions.

If you're thinking about buying an entry level integrated package, this book will give you a good feel for the PFS product and others of its type. If you already have the package but need some help, it's is a very competent introductory tutorial and would be a good buy.

John Craick

Enable: Secrets, Solutions and Shortcuts

Author: Yvonne Johnson
Publisher: Osborne/McGraw Hill
ISBN: 0-07-881488-X
Price: $45.95

Yvonne Johnson has run many Enable courses in the US. The 730-odd widely spaced pages of this book read like a compilation of notes for her introductory courses.

The title is misleading — 'Enable: A Beginner's Overview' would be more accurate, if less saleable.

One of the usual attractions of third-party books is that they can tell you things that the software publishers won't — like

whether the database turns to mush if a file exceeds 2000 records, and where the bugs are. Few, if any, of Enable's secrets are exposed in this book. Notably, two bugged areas of Enable 2 are not discussed.

Another attraction of third-party books is their potential to deal with topics in more depth than the manuals, or to present material more clearly. While Johnson's presentation is sound, issues are covered in less depth than Enable's manuals. The structure of the book is similar to that of the manuals (exposition of commands and functions) and so fails to offer a fresh perspective.

Enable: Secrets, Solutions and Shortcuts is sprinkled with tips and traps, sometimes useful, mostly banal. For example, 'Be sure to read the on-screen installation questions and instructions before making keyboard responses'.

As a rock-bottom basic introduction to the package, the book is competent. However, it fails to offer anything of significance that Enable's own hefty manuals, online help and tutorials don't do already.

Michael Aitken

Mastering Symphony

Author: Douglas Cobb
Publisher: Sybex (distributed by The Law Book Co)
ISBN 0-89588-494-1
Price: $54.95

Mastering Symphony is one of a series of instruction books on popular software programs from Sybex under the 'Mastering' heading. In its promotional literature, Sybex proudly quotes *Stock Market* magazine: 'There is probably no bad Sybex book'. Certainly, with this tome — it fills up 857 pages — Sybex tries hard to meet that claim.

The author, Douglas Cobb, is a well-known writer in the US on software and, in particular, spreadsheets. Symphony is an integrated program — spreadsheet, word processing, database, graphics and communications — from Lotus Development, which brought the world Lotus 1-2-3. In Cobb's view, Symphony's spreadsheet can stand on its own against Lotus 1-2-3.

The book contains eight chapters: Introduction, Spreadsheet, Services, Graphics, Word Processing, Database Management, Communications and Advanced Topics. These are further divided into 28 comprehensive chapters, including one on software add-ins for Symphony. Perhaps the only thing missing is a summary of each chapter and a list of the commands covered.

Markers in the text, a common Sybex feature, denote differences between the versions of Symphony. Although there is no separate index of spreadsheet function commands, they are noted in the superb index at the back of the text.

Douglas Cobb presents a guide to using Symphony with sound explanations and clear examples. While no manual or book of this nature could be called interesting, an easy style avoids boredom, and brings out the potentialities of Symphony.

After reading *Mastering Symphony*, both the convinced Symphony user and the new purchaser will want to use the program.

Tasker Ryrie

Mastering Framework III

Author: Douglas Hergert and Jonathan Kamin
Publisher: Sybex (distributed by The Law Book Co)
ISBN: 0-89588-513-1
Price: $49.95

Mastering Framework III is an integrated program — outliner, word processor, spreadsheet, database and communications — priced at the upper end of the market.

Integrated programs have had a poor innings until recently, and are now among the best-selling programs among middle management and laptop users.

Mastering Framework III follows Sybex's well established formula of good organisation, clear layout, sound writing, and a multitude of screen dumps and examples. Both authors have been writing about computers for many years.

The book is intended for first-time and intermediate users, and doesn't deal with the more advanced features of Framework's programming language, Fred. The book opens, literally, with a list of the cursor movements and main edit keys, while mouse techniques and macro key functions adorn the inside back cover.

There are eight chapters: A First Look at Framework III, Outlining, Spreadsheets, Word Processing, Databases, Telecommunications, An Introduction to Fred Programming, and Working with Other Programs. There are three appendixes: Installing and Customising Framework III, Fred Functions, and Tables of ASCII Characters.

Symbols are used in the margin of the text to alert readers to new features in Framework, and to point out differences between various versions of the program.

New users and many current users of Framework will find this book answers most of their needs, but advanced users will need to look elsewhere for elaboration on Fred.

Tasker Ryrie

Mastering SuperCalc5

Author: Greg Harvey and Rick Hellewell
Publisher: Sybex (distributed by Law Book Co)
ISBN: 0-89588-624-3
Price: $49.95

Some software companies must regret the need to produce a manual, when they know that only a few months later Sybex will produce a book about their program, and the book may well be better than the manual. Software companies also probably wonder why people are prepared to buy a book about a program, yet remain reluctant to read the manual that came with the program. Perhaps because they paid for the book? Doubtless, some companies have considered making people pay for the manual too!

SuperCalc5, one of the oldest spreadsheets available, has been recently revamped. The authors of *Mastering SuperCalc5* have based it on revision C of the program. Rick Hellewell is President of the Sacramento PC Users Group, the fifth largest user group in the US, and Greg Harvey is the author of several books on computer software.

Their book is broken into three parts: Getting to Know SuperCalc5, Using SuperCalc5, and Advanced Techniques and Applications, for novice, intermediate and advanced users respectively. There are 11 chapters all told, a Glossary, ASCII Table, and the SuperCalc5 Slash Command Map, which shows the menu structure reached by pressing the / (slash). Margin notes supplement the text, give tips on using SuperCalc5, and warn about features that have the potential to cause trouble. This is a particularly useful feature given the ingenuity of users in finding ways to lose data, despite the countervailing ingenuity of the programmers to try and prevent such loss.

Novice users of SuperCalc5 will have no difficulty in following the text and examples in this competent work, and experienced users will quickly find what they need. Who needs a manual?

Tasker Ryrie

Using Agenda

Author: Mary Campbell
Publisher: Osborne McGraw-Hill
ISBN: 0-07-881409-X
Price: $45.95

Agenda is one of those landmark applications still looking for a use. As Campbell says in her introduction, 'its effective use and possibilities are not readily apparent'.

Any book that can shed some light on Agenda's mysteries is welcome. This 762

"The best-engineered Multi-Channel Boards on the market today."

SCO XENIX
SUN O/S 386i
PC-MOS
VENIX
OS/2
AT&T 6386 UNIX
MICROPORT
THEOS
EVEREX XENIX
IBM XENIX
BOS

INTERACTIVE UNIX
CONCURRENT DOS
PICK
QNX
MS/DOS
PC/DOS

DigiBoard
Plugging you into tomorrow

AND

TATUNG
TERMINALS

Distributed by Stanilite

The Multi-Channel/Multi User adapters with more software compatibility than any other Multi-user sub-system

DEALER ENQUIRIES WELCOME

Stanilite Electronics Pty Ltd *INC. IN NSW*

UNIX/XENIX HOTLINE

(008) 22 4537 OR (02) 646 4011

FAX (02) 649 7522

Office in NSW, Vic, Qld, SA, WA and NZ.

☐ Please send more information ☐ Digiboard ☐ TATUNG
☐ Please have a salesman phone

Name _____
Position _____
Company/Institution _____
_____
Address _____
_____
_____ Post Code _____
Phone _____ Fax _____
Stanilite Electronics Pty Ltd (INC. IN NSW)
23A Nyrang St, Lidcombe NSW 2141

page tome is as good as they get and belongs on the bookshelf of every Agenda user.

Forget fathoming Lotus's two Agenda manuals. *Using Agenda* starts at the beginning, noting the difference between Agenda and other database products, and goes on to explain the key concepts of items, views, notes, categories and the Agenda interface.

The book then covers the creation of an Agenda database, with an explanation of how to enter and edit items and notes. Subsequent chapters deal with structuring databases, setting up views, obtaining a hard copy and managing files.

The book is particularly invaluable in its detailed explanation of item conditions and assignment, Agenda's use of dates and what actions are all about. These are the features that give Agenda its power and are hard for the new user to understand.

For the advanced user, there is extensive coverage of importing and exporting to and from Agenda, writing macros and customising the preference settings. The only slight criticism is that it lacks a 'do as I do' approach. The reader is left to try things out on their own database. However, that is largely rectified in Part 3 of the book, which contains suggestions and skeletons for a range of applications. Financial, general business, legal and medical applications are covered, as well as how to use Agenda to help in writing software or reports and analysing long legal or technical documents. For the large number of Agenda owners looking for something to do with the application, the answer might be here.

Using Agenda is rounded off with comprehensive reference sections on commands, accelerator keys, and even a tear out command sheet. It all adds up to a thorough and long-overdue treatment of what to many is a puzzling program.

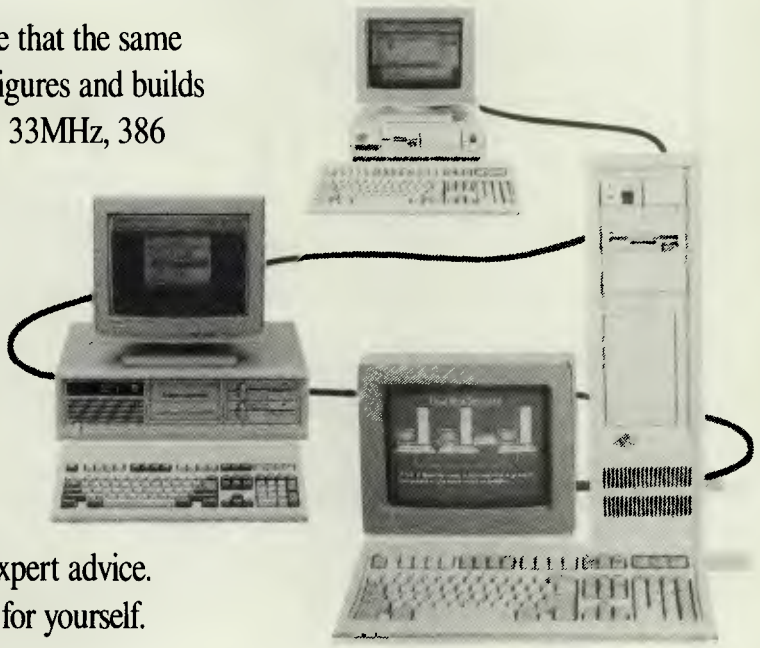
Kester Cranswick

END

"There you are sir. One MacPaint, one MacWrite, one MacAccountant, two MacSlots, one MacPhone and one MacDraw. Would you like fries with that?"

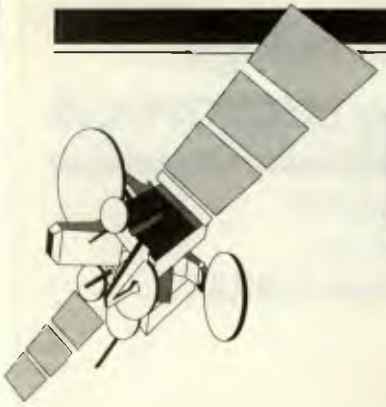
Doesn't it make sense that the same company that configures and builds powerful desktop or tower, 33MHz, 386 Unix-based systems and distributes the popular D-Link LAN, can also supply, support and service your entire PC network or computing needs?

And, we offer manufacturer prices plus expert advice. Call us today and find out for yourself.



acTek Systems Pty. Ltd.

VIC: 250 Gore Street, Fitzroy 3065. Ph: (03) 419 6244
NSW: 21 Sydney Road, Manly 2095. Ph: (02) 977 5086



Hackers on hold

The latest updates in the bulletin board world with Steve Withers.

Since PC Connection expanded to 12 lines, the level of abuse — in the form of offensive language or attempts to hack into the system — has become too high for sysop Lloyd Borrett to ignore.

Mr Borrett and Telecom Protective Services (TPS) have co-operated to make it possible to place a hold on the line being used by such offenders, allowing TPS to trace the offending caller as a prelude to a charge under the Federal laws governing the improper use of telecommunications services, unlawful access, intent to defraud or damaging data. Such offences can be punished by up to 10 years in jail.

It is hoped that the abusers will either change their behaviour or go elsewhere rather than risk prosecution, but any outcome that reduces or eliminates abuse is sure to be welcomed by legitimate users.

FBBS-PC!

FBBS-PC! is a recent addition to the range of BBS packages available to the would-be sysop. Produced by Melbourne-based FBBS-PC! Software Systems, the program provides the usual facilities like multiple file and message areas, X, Y and ZModem transfers, and support for most modems. The developer claims ease of use from the sysop's perspective as a key feature of the program, and puts its money where its mouth is by providing phone support despite the low $50 price tag.

The system is written in QuickBasic and so has considerable potential for customisation — an extra $149 buys the source code and programmer's documentation.

For further information contact FBBS-PC! Software Systems, PO Box 142, Glenhuntly, 3163; tel: (03) 720 5177; fax: (03) 720 6595.

System news

Electronic Gazette, a new Sydney board listed below, is said to be arranged in magazine form, offering a range of editorial material concentrating on business, computers and electronics. If you want a change from run-of-the-mill BBSs, this might be worth a look.

The closure of Larry Lewis' Prophet TBBS system in Sydney should not go without particular mention. Larry's efforts in helping to develop the BBS community deserve our thanks.

Thanks to Rodney Creer, Lloyd Borrett, Nicholas Dore, Jerzy Farynski, Paul Johnson, Peter Silver, Tim Spey and my pseudonymous correspondents from PC Connection.

New systems

NSW

BAD NEWS BBS (02) 587 8441. M. Wayne Steele. V21, V22, V22bis, V23, Bell 103, 212.

Broadcast ONLINE (02) 416 9279. P. Michael Wass. V21, V22, V22bis, Bell 212. GTnet 302/017.

Disaster Area BBS (02) 988 3287. Victor Bouch. V21, V22, V22bis, V23. FidoNet 3:711/801.3.

Electronic Gazette (02) 548 1476. MV. Jerzy Farynski. V21, V22, V22bis, V23. 6am-midnight daily.

MISSION ONE BBS (02) 545 2512. M. Steven Black and Shane Hunter. V21, V22, V22bis, V23, Bell 103, 212.

SPEEDING BBS (02) 750 2036. M. 'Colin'. V21, V22, V22bis, V23, Bell 103, 212. 11pm-7am daily, 11pm Sat-10am Sun.

The FORUM BBS (02) 522 9472. M. Simon Foster. V21, V22, V22bis, V23, Bell 103, 212. FidoNet 3:712/265. 11pm-6am daily.

SOFT-TALK BBS (046) 25 2199. P. Aldo Ferraro. V21, V22, Bell 103, 212.

The Round Table (043) 43 3036. MV. 'Merlin'. V21, V22, V22bis, V23, V32, Bell 103, 212.

ACT

AQNXUG BBS (06) 241 1662. MV. V21, V22, V22bis, V23. FidoNet 3:620/246.

Cause BBS (06) 255 1469. M. Peter McNeill. V21, V22, V22bis, V23.

Vic

Antimatter BBS (03) 754 3080. P. 'The Quasarman'. V21, V22, V22bis. 7am-5pm weekdays, 8am-1pm weekends.

Interleave-Microscience BBS (03) 562 8373. P. Greg Furlong. V21, V22, V22bis. FidoNet 3:633/361.

MacInsight BBS (03) 822 2919. P. Paul Johnson and Daniel Brooke. V21, V22, V22bis, V23. 24 hours daily.

Melbourne Novell User Group (03) 523

Aiming for superior Hard Disk Drive technology?

Set your sights on the Winchester Disk Drives by MICROPOLIS

Whatever your operational requirements, from 70 to 765 - megabyte and 1.2 - gigabyte, your target must be the MICROPOLIS Winchester Disk Drive from LIBRA

MICROPOLIS designed and manufactured Winchester Disk Drives are the most sought after by Original Equipment Manufactures (OEM's) for incorporation into high-performance micro and minicomputer systems for simple and multi-user applications, including computer-aided design, professional workstations, and local area networks.

MICROPOLIS Winchester Disk Drives are designed to provide a combination of high storage capacity, fast access and data transfer, and long periods of trouble free operation.

Micropolis Drives consistently top the list for high "plug and play" and mean-time-between-failure performance. All boards and mechanical fixtures are independently replacable units. No electronic or mechanical adjustments are ever required, making field replacement of electronic assemblies a simple 15 minute maximum repair.

The range of interfaces spans from ST-506, ESDI, high performance SCSI and AT-Bus.

Where performance, quality and reliability is your priority, see the people with the products and the expertise ...

libra

LIBRA ELECTRONICS PTY. LTD.
for tomorrow's technology ... today.

Unit 9, 552-560
Church Street, North Parramatta NSW 2151
Phone: (02) 890 1704 Fax: (02) 890 1513

0482. Chris Stegner. V21, V22, V22bis, V23. FidoNet 3:634/383.
Nemesis (03) 331 1155. P. 'Amphion' and 'Riddler'. 24 hours daily. Entertainment system.
Nightmare BBS (03) 560 7386. P. 'Superboy', 'Handyman' and 'Razor'. V21, V22, V22bis, V23.
NonStop BBS (03) 598 8778. 'Sorceror'. V21, V22, V22bis, V23.
Phase V (03) 803 6976. P. 'Psycho Felix'. V21, V22, V22bis, V23.
RBBS of Melbourne (03) 794 9754. P. David Gaze. V21, V22, V22bis, V23.
Technique (03) 331 6250. 'Acid Man'. 24 hours daily.
The Central Scrutinizer (03) 563 8117. P. 'Sheik Yerbouti'. V22, V22bis.
The Thin Red Line (03) 568 4438. P. Dale Robinson. V21, V22, V22bis, V23. FidoNet 3:636/316.
Thunderdome BBS (03) 338 0739. P. Ian Mason. V21, V22, V22bis. FidoNet 3:635/506.
A & C Land (053) 42 0807. P. Stephen Walsh. V21, V22, V22bis. 7.30pm-6.30am weekdays, 24 hours weekends.
Amiga World (053) 44 9378. Nicholas Dore. V21, V22, V22bis. 24 hours daily.
Jeff's Amiga Board (051) 277 135. P. Jeff Stevenson. V21, V22, V22bis, V23.
Zim's BBS (051) 43 1671. P. Graeme Zimmer. V21, V22, V22bis, V23. FidoNet 3:632/352.

Qld

Access Australia BBS (07) 284 6990. P. William Brackenridge. V21, V22, V22bis, V23. FidoNet 3:640/207.
Dove System (07) 851 1413. MV. Daniel Churchman. V21, V22, V22bis, V23, Bell 103, 212. FidoNet 3:640/777.
The Galaxy Mail Dispatch (07) 207 9316. MV. James Collins. V21, V22, V22bis, V23, Trailblazer. FidoNet 3:640/316. NB press RETURN to select BBS.
The Messenger QuickBBS (07) 282 6022. P. Allan Richards. V21, V22, V22bis, V23.
The ST Afterburner! (07) 855 1146. M. Michael Clark. V21, V22, V22bis, V23.

SA

Mountford Computer Services BBSS (08) 379 0001. P. 'MC'. V21, V22, V22bis, V23, Bell 103, 212. FidoNet 3:681/854.2. 11pm-6.30am daily, 10.30am-3pm weekdays.
The Hang Out BBS (08) 277 3952. P. Sean Johnson. V21, V22, V22bis. 7.30pm-7am Mon-Thurs, 4pm-7am Fri-Sun.

WA

Highflyer! (09) 448 0880. MV. Stuart Udall. V21, V22, V22bis, V23, Bell 103, 212. FidoNet 3:690/611.
The Sentinel BBS (09) 295 3275. P. Andrew MacBeth. V21, V22, V22bis, V23.
Tower BBS (09) 250 1854. P. Lindsay Blume. V21, V22, V22bis, Bell 103, 212. FidoNet 3:690/634.

Updates

NSW

2000 and Beyond AliveBBS (02) 544 7123. M. Greg Kuhnert. V21, V22, V22bis, V23, Bell 212. FidoNet 3:712/513.
Club Mac Remote Maccess System (02) 907 9198. MV. Brian Macdonald. V22, V22bis, V32.
Club Z.A.U.G. Amiga BBS Offline.
Computrol (02) 489 6848. MV. Bob Spence. V22, V22bis, V32, Bell 212, HST. GTnet 302/004.
Delta Net (02) 457 8281. MV. Geoff Arthur. V21, V22, V22bis, V23, V32, Bell 103, 212.
Display Systems Australia BBS Offline
Eden (02) 699 9342. MV. David Luong. V22, V22bis, Bell 212, Trailblazer. FidoNet 3:712/631.
Imagineering BBS Possibly offline.
J & M's TBBS (02) 749 1935. MV. John and Megan Kelly. V21, V22, V22bis, V23, Bell 103, 212, Trailblazer. FidoNet 3:712/625.
Monitor World Offline
Omega Board BBS (02) 528 4200. M. Paul Speirs and Linda Piltz. V21, V22, V22bis, Bell 103, 212. FidoNet 3:712/711.
Prophet TBBS Offline.
Random Access Bulletin Board Offline.
Sci-Fi BBS Offline.
Sys-Ex BBS (02) 356 4148. P. Scot Art. V21, V22, V22bis. FidoNet 3:712/634. Formerly DaDa QuickBBS.
Talking Heads BBS (02) 399 7332. Jim Caldwell. V21, V22, V22bis, V23. 2.30pm-7.30am weekdays, 24 hours weekends.
Tall Tower BBS (02) 632 1128. P. Charles Yendle. V21, V22, V22bis, V32, HST. FidoNet 3:711/417.6.
The Black Hole (02) 719 8161. M. Ken Thompson. V21, V22, V22bis, Bell 103, 212, HST. GTnet 302/003.
The Dead Zone Possibly offline.
The Network Connection BBS (02) 416 1078. P. Tony Johnson. V21, V22, V22bis.
Trantor Offline.
Beauford BBS Possibly offline.
PALANTIR BBS — ONE THE BORDER! (060) 40 1284. P. Steve Sharp. V21, V22, V22bis, V23, Bell 103, 212. FidoNet 3:712/207.
Sorcim microS (065) 59 5403. P. John Caine. V21, V22, V22bis, V23, Trailblazer. FidoNet 3:711/405. 9pm-8am daily.

How to employ a top 'Business Manager' without increasing your payroll

NEW MULTI-USER NETWORK RELEASE

Recruit our Information Business Manager- over 8000 Australian companies already have!

The New multi-user network Business Manager provides a comprehensive fully-integrated software package for all your accounting and management needs.

- Debtors
- Creditors
- Invoicing
- Sales order
- Stock control
- Purchase orders
- General ledger
- Job costing
- Bill of materials
- Point of sale
- Automatic billing
- **even Payroll!**

No competitive package offers you so many features in such a flexible and easy-to-use format. Available in single or multi-user versions, Information Business Manager is designed to grow with your business.

Best of all, you can buy Information Business Manager for as little as a week's salary.

For a FREE demonstration disk contact your leading computer retailer or Information Unlimited:

Melbourne:	Ph (03) 813 3022	Fax (03) 882 5887
Sydney:	Ph (02) 387 3300	Fax (02) 387 8138
Brisbane:	Ph (07) 857 4264	Fax (07) 260 5926
Perth:	Ph (09) 444 5000	Fax (09) 444 6229

Information Unlimited (Aust.) Pty. Ltd.

Response 2902

ACT

NB: The STD code for Canberra has changed from (062) to (06), and all existing numbers have been prefixed with 2.

COLD FUSION BBS Offline.
Ghost of Opus (06) 258 7160. P. Scott Furry. V21, V22, V22bis, Bell 103, 212. FidoNet 3:620/240.
MICSIG Fido (06) 285 1026. P. V21, V22, V22bis, V23. 24 hours daily.
PC Exchange Opus (06) 258 1406. MV. Phil Harding. V21, V22, V22bis, V23. FidoNet 3:620/244.
PCUG Bulletin Board (06) 259 1244. MV. Alan Salmon. V21, V22, V22bis, V23, Trailblazer. FidoNet 3:620/243.
Percom BBS (06) 281 3119. P. Alex Reutt. V21, V22. FidoNet 3:620/247. 9pm-7am daily.
The Capital BBS (CUG [ACT] Inc.) (06) 281 0847. MV. Basil Chupin. V21, V22, V22bis, V23. FidoNet 3:620/241.

Vic

ABE Opus Possibly offline
ANZUGS CBCS Possibly offline.
Arcadia Opus (03) 867 8793. P. Andrew Newbury. V21, V22, V22bis, V23. FidoNet 3:634/385.
Austech BBS (03) 894 2155. P. Lucas Lozo. V21, V22, V22bis, V23, V32.
Bay City BBS Offline.
Delta BBS Offline.
Dr Blaze (03) 890 9323. P. Ron Lyth. V21, V22, V22bis. FidoNet 3:634/384.
Eastwood Opus Offline.
EasyAccess (03) 585 0495. P. Garry Gillard. V22, V22bis, V32. Formerly The Cheltenham Exchange. FidoNet 3:636/200.
Gamma Computers Possibly offline.
Happy Hacking BB Possibly offline.
Micronet Information System Offline.
Millenium BBS (03) 720 6816. P. 'Max Headroom' and 'Fred Frog'. V21, V22, V22bis, V32. FidoNet 3:636/310. Formerly The Last Crusade.
MBUG Australia Inc Offline.
Mercury BBS (03) 887 1485.'Nils Desperandum'. V21, V22, V22bis, V23. 24 hours daily.
PC Connection Australia (03) 388 0909 (8 lines). MV. L Borrett. V21, V22, V22bis, V23. Also on (03) 388 0133, V21, V22, V22bis, V23, V32, MNP. 24 hours daily.
Physi-Chall Possibly offline.
Rastar (03) 369 2403. MV. 'Alf'. V21, V22, V22bis, V23.
The Bear Essentials (03) 877 7333. P. Paul Ridley. V21, V22, V22bis, V23. FidoNet 3:633/365.
The Black Board Offline.
The Cafe (03) 894 2815. P. Cefiar Channadranac. V21, V22, V22bis, V23.
The Cage Offline.
The Clone Phone Possibly offline.
The Fourth Dimension BBS (03) 560 9292. P. 'Galvatron'. V21, V22, V22bis, V23.
The Roaring Rapids (03) 877 2609. P. Greg Holloway. V21, V22, V22bis, V23. FidoNet 3:633/203.
The Software Bank (03) 816 9439. MV. Simon Walsh. V22, V22bis, Bell 103, 212, Trailblazer. FidoNet 3:632/301.
Wescom (03) 521 2192. P. 'The Grand Admiral'. V21, V22, V22bis, V23. 5pm-8am weekdays, 24 hours weekends.
A & C Land (053) 42 0807. P. Stephen Walsh. V21, V22, V22bis. Enter '0' for NEW accounts, '?' for menus.
Dimboola Central Bulletin Board (053) 89 1111. M. Steve Collins. V21, V22, V22bis, V23, Bell 103, 212.
Eastern Plains BBS (051) 76 1125. M. Martin Taylor. V22, V22bis. 10am-11pm weekdays, 24 hours weekends.
Latrobe Valley BBS Offline.
Nitroland (054) 41 6515. MV. Nitro. V21, V22, V22bis, V23.
Niveous (053) 33 2170. P. R Russell. V21, V22, V22bis, V23, V23ORG, Bell 103, 212.
The Boolean Board Possibly offline

Qld

Bayside Mail Centre (07) 893 1985. P. Ernst Preuss. V22, V22bis, V23. FidoNet 3:640/730. Formerly Hitek Junkyard.
Blue Lagoon BBS — Qld Offline.
CAVALIER BBS Offline.
Christian Resource — BBS (07) 257 1466. Kerry Robinson. V21, V22, V22bis, V23. FidoNet 3:640/101.
Electric Dreams BBS (07) 399 1322. MV. Joe Altoff. V21, V22, V22bis, V23.
Software 80 BBS Offline
The Galaxy GateWay Computer System (07) 207 8900. MV. James Collins. V21, V22, V22bis, V23. FidoNet 3:640/230.
The Missing Lynx CIBS (07) 808 3094. P. Mike Barber. V21, V22, V22bis, Bell 212, Trailblazer. FidoNet 3:640/808.
20 Meg Magic Offline.
LANAI (075) 92 1947. P. Ray Nugent. V21, V22, V22bis, V23, V32. FidoNet 3:640/921.
Sidecar Express BBS (075) 46 3252. MV. Brendan Pratt. V21, V22, V22bis, V23, V32. FidoNet 3:640/463.

SA

ADAM (08) 370 5775. MV. Greg Hicks. V21, V22, V22bis, V23, V32, Trailblazer. FidoNet 3:680/805.
Computer Talk Offline.
DISTRIBUTOR BBS (08) 235 1766. M. Steven Dunk. V21, V22, V22bis, V23.
Sean's System Offline.
Stuff Happens BBS (08) 338 2272. P. Scott Cadzow. V21, V22, V22bis, V32. Formerly Cadzow Access.
TAN80 BBS (08) 326 1132. P. Erik Rasmussen. V21, V22, V22bis, V23. FidoNet 3:680/822.
The Data-Dump BBS Offline.
Township Of ComputerRun BBS (08) 297 3933. P. David Walters. V21, V22, V22bis. FidoNet 3:680/825. 8pm-2am Wed-Sun.
Concept BBS (085) 68 2677. P. Ben Johnson and Daniel Waldron. V21, V22, V22bis. FidoNet 3:681/866. 8pm-8am weekdays, 6pm-9am weekends.

WA

2280 BBS Offline.
Blood & Silicon BBS Offline.
Chip Board (09) 572 1779. P. Bradley Gawronski. V21, V22, V22bis, V23.
CITADEL BBS Line 1 (09) 367 8856. P. Adam Blake. V21, V22, V22bis, V23, V32. FidoNet 3:690/632.
Galaxy Alliance Offline.
Hedland's First Opus Bulletin Board Offline.
Nemo Games Machine (09) 370 2666. M. Graeme Platt. V21, V22, V22bis, V23.
Nemo Multiple BBS RAPL (09) 370 1855. MV. Graeme Platt. V21, V22, V22bis, V23.
Split Infinity Offline.

Tas

Premium PCBoard BBS (002) 49 1011. MV. Peter Silver. V21, V22, V22bis, V23, V32 (MNP). 24 hours daily. FidoNet 3:670/204. AlterNet 7:831/341.
Tassie Bread Board System (003) 26 6114. MV. Ian Campbell. V21, V22, V22bis, V32, Bell 103, 212. FidoNet 3:670/302.

END

Submissions

The material in this column is presented in good faith, but as it is collated from material obtained from a variety of sources, *APC* cannot take responsibility for its accuracy.

New information and corrections are always welcome (but please mention whether or not you can vouch for the accuracy of the material provided) and should be sent to the attention of Steve Withers at one of the following addresses: Computer Publications, 122 Ormond Road, Elwood 3184; or to FidoNet, 632/305 (Brainstorm Oz! (03) 758 7086).

Acknowledgements will be made through this column. *APC* exchanges information with the Australian BBS Registry, but if you wish to contact the registry co-ordinator directly, he can be reached at FidoNet 680/808 (Australian Bulletin Board Registry, (08) 281 0433).

SIGMA SUPPLIES

LASER PRINTER TONER CARTRIDGES

CARTRIDGES TO SUIT ALL CANON BASED PRINTERS SUCH AS:

- Apple LaserWriter
- Apple LaserWriter IINT/X
- HP LaserJet Series
- All Canon based laser printers
- Impact/Gestetner
- Brother HL–8, Star
- Wang LPS–8 & LCS–8

ONLY **$169** Inc. Tax

TOSHIBA (PageLaser12) & DATAPRODUCTS (LZR1200 Series):

- Toner Kit (6 cartridges) **$243.**
- Drum Cartridge **$456.**
- Developer Cartridge Kit **$335.**
- Fuser Cartridge **$173.**

RICOH based 8 & 15 ppm LASER PRINTERS:

- Toner Kit (2 cartridges) **$100.**
- OPC Belt Kit **$359.**

☎ NSW QLD ACT WA ... 008 023883 – & – ☎ VIC TAS SA ... 008 335732

All major credit cards welcome ****Including Sales Tax***

HOW TO DODGE THE "SHARKS"

Have you ever been confronted by JAWS?

You walk into a computer shop, the sales person glides up and circles you.

After a short time you stagger out completely mystified by the jargon and useless information rammed down your throat.

I can help you avoid this problem. I run a business with the sole aim to provide YOU, the customer, with total service and commitment. A genuine shark proof repellent.

Let me explain. When you deal with our company you get top quality, guaranteed and proven products delivered to your door.

I am a direct importer of the GENIUS Range of products. This means you get total support and product knowledge when you buy.

We have the total MOUSE RANGE from the GM6XA through the GM6000 to the top of the line the NEW GMF303 2-3 button mouse with CAS CAD 1, a 2D CAD package

As well as the mouse range, we also have the GS4500 HAND SCANNER with Scan Edit, Dr Genius and Prodigy O.C.R. Software. This is an ideal product for the user who wants to add impact to their work by importing photographs and drawings.

If you are involved in the C.A.D. area then you will definitely be interested in the GENIUS DIGITIZER TABLET, the new Genius 1212B. This is a 12*12 inch tablet that comes with drivers for AutoCad™ and other popular C.A.D. packages.

We also stock the total range of *BIT BLITZER MODEMS* from the 121 through to the 1234E.

Remember we are the only importers prepared to issue you with a WRITTEN 12 month replacement warranty card.

If you are not happy with the product, send it back and we will refund your money.

In addition, you will get a FREE $10.00 refund off your next purchase* when you return our Warranty Card.

I know you will be satisfied with our products and service. Just contact Mick or Lyn Symons of **QUALITECH COMPUTER PRODUCTS** on (08) 356-7337 to place your order. We will rush it to your home address as soon as possible. (You can Fax your order through on (08) 234-0137).

P.S. If you are one of the first 20 people to buy I will give you FREE a copy of Gem Desk Top version 3, VALUED AT $45.00.

P.P.S. If you are a dealer and want to stock a quality peripheral then contact us for aggressive dealer pricing.

* All you do is send back the new warranty card for that purchase of one of our products and I will send you back a $10.00 cheque. Simple as that!

FREEWAY

CONNECT YOUR COMPUTERS

Freeway connects your computers together, letting them transfer files, share printers and send messages.

Features - memory resident, pop-up windows, background transfers.

Alternative to AB switches, Buffers simple transfer programs... even Networks!

F2-Freeway for 2 computers -$199.00
F4-Freeway for 4 computers -$599.00
Pixicom for modems -$299.00

FREEWAY - ALMOST A NETWORK

Program Development Systems

ph (03)563 3063 fax (03)563 3082

Conferences/Meetings

May

8-9 **Compaq Technology Forum** Your chance to hear Dr Edward de Bono, Compaq CEO Rod Canion and many other speakers, and see the most sophisticated multi-vendor/operating system LANs ever configured in Australia. *Enquiries, Sherryl Caulfield, tel: (02) 439 3655*

15 **Harvard Graphics Users' Group** The newly-formed Harvard Graphics Users' Group will meet on the third Tuesday of every month, beginning on May 15. All Harvard Graphics users are invited to attend. *Enquiries, Software Publishing, tel: (02) 418 7188*

16 **Sinclair Users' Group** The Waverley group meets on the third Wednesday of the month at the Mount Waverley Community Centre in Miller Crescent at 7pm. *Enquiries, Cliff Restarick, tel: (03) 528 2539*

22-25 **Fifth Australian Software Engineering Conference** 'Software Engineering — Bondage or Discipline?' is the conference theme. For the answer, come to ASWEC '90 at the Hyatt Kingsgate Hotel, Sydney. *Enquiries, Cherie Morris, tel: (02) 327 4822*

24 **Clipper Users' Group** The Clipper Users' Group meets from 7.30 to 10.30pm at the Nunawading Public Library, CL Willis Room, Whitehorse Road, Nunawading. *Enquiries, Duncan McIntosh, tel: (03) 667 0231*

28 **Ventura Publisher Users' Group** This group meets at Future Technologies on the last Monday of the month commencing at 6pm. *Enquiries, Cynthia Kuiper, tel: (02) 261 4211*

Exhibitions

May

14-17 **CASExpo Australia** The second annual Computer-Aided Software Engineering Conference and Expo will be held at the Southern Cross Hotel in Melbourne. *Enquiries, Steve McManus, tel: (02) 283 1825*

Training

May

7-8 **OS/2 — The New Direction In Personal Computing** This course, presented in Canberra by Les Bell, covers topics such as OS/2 architecture, strategy and compatibility. *Enquiries, MTE, tel: (008) 024 083*

25 **Understanding Networking** A half-day course in understanding networking is offered by M&S Computing of North Sydney. *Enquiries, Vicki Pund, tel: (02) 954 0333*

14-18 **Business Systems Analysis** For those involved in systems analysis, this course will teach you to perform a feasibility study and a detailed systems investigation. *Enquiries, Judy Hillyard, tel: (02) 922 1899*

16-17 **Introduction to Lotus 1-2-3** Western Sydney-siders can take advantage of this course offered by the Western Sydney Information Technology Centre in Parramatta. *Enquiries, WS ITeC, tel: (02) 891 5588*

16-18 **Basic Telecommunications, Voice Systems and Telecommunications Management** To get the most for your telecommunications dollar, attend this three-day course in Melbourne. *Enquiries, Housley Computer Communications, tel: (02) 498 7877*

17-18 **Quattro Advanced** Polish up your Quattro skills with this two-day course offered by BMS Corporate Services in North Sydney. *Enquiries, BMS, tel: (02) 923 2500*

22 **Working With Unix** The Australian Institute of Management, Adelaide, is holding this course for those with a knowledge of DOS and programming who wish to learn about the Unix operating system. *Enquiries, Cate Diddams, tel: (08) 212 316621*

22-29 **NetWare 286 System Manager** Datamatic in Sydney offers this as an evening course. *Enquiries, Anne-Marie Akehurst, tel: (02) 449 8133*

25 **Advanced Ventura** A half-day course outlining the advanced features of Ventura, including trouble shooting tuition for correcting irregular justification of text and leading. *Enquiries, Erika Wicht, tel: (02) 957 6299*

26 **Advanced DOS — Level 1** Compuskill of Footscray in Melbourne offers this training course which covers in depth the DOS commands for power usage of your IBM PC. *Enquiries, Denise Withy, tel: (03) 689 3833*

Compiled by Janice Hogg, tel: (03) 531 8411 or fax: (03) 525 6125.

PC user groups

Computer Publications is preparing the July edition of the Buyers' Guide to Software. As a new service, the Guide will be freely listing all PC user groups operating in Australia.

If you have not already been contacted by Information Services to provide details about your user group, please contact Vincent Jones on (02) 387 3888 before May 18, 1990 to ensure that your group is listed.

Aiming for superior Hard Disk Drive technology?

Set your sights on the Winchester Disk Drives by NEC

Whatever your operational requirements, from 50-760 MB, your target must be an NEC Winchester Disk Drive from LIBRA.

FEATURES

- Large Capacity: 50-760 MB
- Data Transfer Rate: Up to 4.8MB/sec
- Average Seek Time: Up to 18 msec
- ESDI, SCSI, PC/AT Interface
- Auto Retract Mechanism

SPECIFICATIONS

Model	D5655	D5662	D5862	D5682	D5882
Interface	ESDI	ESDI	SCSI	ESDI	SCSI
Performance Specifications					
Capacity (MB)					
Unformatted	179.86	385.4	384.5	765.4	764.0
Formatted*	140.38	300.8	328.2	664.7	675.9
Data Transfer Rate (MB/sec)	1.25			1.875	
Average Seek Time (msec)	18			16	
Average Latency Time (msec)	8.4			8.3	
Rotational Speed (rpm)	3,573			3,600	
Functional Specifications					
Recording Method	2-7 RLL			1-7 RLL	
Recording Density					
Bit Density (bpi)	19,610	19,660		30,760	
Track Density (tpi)	1,240			1,480	
Number of Disks	4				
Number of Data-Heads	7	15			
Number of Cylinders	1,224	1,224	1,221	1,633	1,630

Model	D3142	D3741	D3841	D3661	D3761	D3861
Interface	ST412	PC/AT	SCSI	ESDI	PC/AT	SCSI
Performance Specifications						
Capacity (MB)						
Unformatted	53.4	52.8	56.2	134.5		
Formatted*	42.0	45:1		118.1	114.8	
Data Transfer Rate (MB/sec)	0.625	0.937		1.25		
Average Seek Time (msec)	28	23	28	23	20	
Average Latency Time (msec)	8.33			8.4		
Rotational Speed (rpm)	3,600			3,573		
Functional Specifications						
Recording Method	MFM	2-7 RLL				
Recording Density						
Bit Density (bpi)	14,000	17,000		25,484		
Track Density (tpi)	850			1,311		
Number of Disks	4					
Number of Data-Heads	8			7		
Number of Cylinders	642	423	440	915		

*Formatted Capacity is calculated based on NEC recommended format. Specifications are subject to change without notice.

For the high performance heart of your system, see the people with the products and the expertise.

libra

LIBRA ELECTRONICS PTY. LTD.
for tomorrow's technology ... today.

Unit 9, 552-560
Church Street, North Parramatta NSW 2151
Phone: (02) 890 1704 Fax: (02) 890 1513

Australian Personal Computer

MARKETPLACE

SOFTWARE

DIRECTORY

- CAD /CAM
- COMPUTER BOOKS
- COMPUTER CONSUMABLES
- SOFTWARE
- RIBBON RECYCLING
- TONER RECHARGE
- HARDWARE
- CONSULTING / TRAINING
- DESKTOP PUBLISHING

TopSpeed MODULA-2
TopSpeed C (ANSI) from JPI

- Object Oriented (Modula-2)
- Multitasking under DOS and OS/2
- Run time dynamic library linking under DOS
- Excellent multi window development environment
- Efficient fast code generation
- ToolKits and OS/2
- Best prices

Quotient Technologies
PO Box 178 Kensington NSW 2033
Ph (02) 665 0759 Fax (02) 662 1665

SOME OF THE HORSEPOWER BENEFITS:

- A totally automated system that leaves YOU in control.
- User modifiable rules for rating horse performance.
- Analyses form, weight and track condition etc. to compute the odds you should get.
- Maintains a database of past performance of horses.
- Suitable for both novices and professionals

HORSEPOWER

The Professional Racehorse Rating Tool

An "AMSACS" Expert System

TRADE ENQUIRIES WELCOME

For more details contact Amsacs: Tel: (03) 578 0084 P.O. Box 416 Caulfield East, 3145

Are YOU among the THOUSANDS of people who want to learn UNIX / XENIX / C ?

UNIX
TUTORIAL

(42 lessons in 3 diskettes)

" You'll be amazed how easy it is to learn a lot of things within a short period of time... UNIX Tutorial is priced at such a low figure that thousands (including YOU) can now learn UNIX and get better job and salary... " --- Dr. WANG

System Req: IBM or Compatibles PC & DOS

Special offer: **Only $165**

Phone & mention this ad. for a FREE copy of DEMO diskette

K & A Software Engineering

Ph: 016-285-088 (local call charged from anywhere)

TURBO-MENU™

Australia's own PROFESSIONAL menu system
Thousands of Corporate users in Australia as well as Europe
Less than 3K memory overhead
Totally LAN compatible, no temporary files
Multiple DOS commands for each option
Customisable prompts for parameters
Can be Mouse operated
Comprehensive security features
Passwords and menu files can be encrypted
Two levels of customisable option help
Screen saver and auto hard disk park
Usage logging
Unbeatable Corporate licensing rates
Single copies only $67 (Inc P&P)

VKN Electronics, (08) 278 4597
13 Monash Ave, Belair, SA, 5052

SECURE ACCESS CONTROL & USAGE LOGGING
New – RUNLOG Vers 3.1

REAL SECURITY, no hard disk when booted from floppy
Controls user access with names and passwords
Records WHO runs WHAT, WHEN and for HOW LONG
Also logs access to data files – Uses only 4K RAM
Logging operation is totally transparent
Full control over WHICH programs and files are logged
Full control over format and content of log records
Can use either logging or access control by itself
LAN versions use the LAN's own access control
Pricing starts at only $149 for a 5 machine licence

VKN Electronics, (08) 278 4597
13 Monash Ave, Belair, SA, 5052

Australian Personal Computer

MARKETPLACE

SOFTWARE

ChequeMate

CASHBOOK PROGRAM

Now you can maintain cashbooks on your IBM PC compatible with ease and simplicity. ChequeMate does all the hard work, produces all the necessary reports and performs a full bank reconciliation. Cheque printing and different currency types are standard facilities. Information may be sent from ChequeMate to other database or spreadsheet programs. Multiple cashbooks can be kept simultaneously, each with its own set of dissection headings.

RR $295.00

DEALER ENQUIRIES WELCOME

Distributed by Intersoft Business Systems
22 Michellen Court
Bayswater Vic 3153
Ph: (03) 720 1696 Fax: (03) 729 4878
AH: (03) 876 4084

ChequeMate is a product of
MAGNETIC TOWER Pty Ltd
50 Kalinda Rd. Ringwood Vic 3134

SOFTWARE SUPPORT SERVICES

1073 Flinders Hwy Townsville QLD 4816
P.O. Box 1240, Aitkenvale, QLD 4814
Phone: (077) 78 4866 Fax: (077) 78 4966

WORLD CLASS SOFTWARE AT AFFORDABLE PRICES

SAM Simple Accounts Manager $350
Multi-User/Network. Includes Debtors/Creditors/General Ledger

AWARD WINNER 1990 "THE AUSTRALIAN" COMPUTER SOFTWARE COMPETITION

Simple to use, SAM has features seldom found in accounting systems many times its size, complexity and price. SAM is one of the fastest, most compact, cost efficient accounting programs available in Australia today.

WHY PAY $3000+ FOR A SIMILAR PROGRAM

Some of our other quality programs:
SAMPOS Point of Sale/Cash Register..... $150
SAMJC Job Cards for service agents..... $150
QUIDS Quotes/Invoices/Debtors/Sales..... $250
TURBOSTAR Wordprocessor..... $95
TURBOBASE Database..... $150
MENU includes Supervisor & End User..... $50
CASHBOOK Financial Management System.... $150
(1990 Finalist "The Australian" Computer Software Competition)

Evaluation disk available on request

MEMORY CHIPS

Prices at May 1st

Speed Type		120ns	100ns	80ns
CHIP TYPE		*PRICE EX TAX*		
SIMMS	9*256	30.00	34.00	36.00
	9*1mb		116.00	120.00
(MACS)	8*1mb		108.00	112.00
(IBM)	9*1mb PS2		165.00	
SIPPS	9*256		38.00	40.00
	9*1mb		112.00	116.00
DIP	411000	10.80	11.40	11.80
	414256	10.80	11.80	12.20
	41256	2.85	3.40	3.95
	41464 (256)		3.40	3.95
	4164	2.70	3.00	
ZIP	414256 (1mb)		13.50	15.00
	41256		4.40	
	411000 (1mb)	12.80	13.20	
	4400 (4mb)			98.00

BOCARAM AT-PLUS

Up to 8 MB Memory for 16-bit bus.
Operates with any speed CPU.
Conventional backfill from 512K to 640K.
Supports DOS, OS/2 & LIM EMS 4.0.

With		Price ex Tax
	2MB Memory	550.00
	8MB Memory	1240.00

HP & CANON LASER PRINTER MEMORY 1mb to 4mb

Description		Price ex tax
Model II.IID.LBP 811.R.T	0 Memory	114.00
Model IIP.& III	0 Memory	130.00

GENUINE INTEL MATH COPROCESSORS

Part No.		Price ex Tax
8087-1	10 MHZ	258
8087-2	8 MHZ	194
8087-8	8 MHZ	210
80287-6	6 MHZ	215
80287-8	8 MHZ	346
80287-10	10 MHZ	355
80387-16	16 MHZ	467
80387-20	20 MHZ	616
80387-25	25 MHZ	735
80387-33	33 MHZ	925
80C287-12	12 MHZ	465
80387-SX	16 MHZ	542

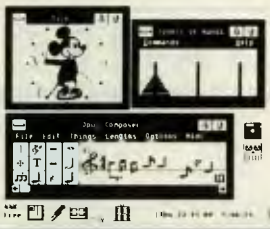
Sales Tax 20%. Overnight delivery.
Credit cards welcome.

Discounts for dealers.

Phone for pricing on 70ns, 60ns, Toshiba & Compaq

PELHAM

Tel: (02) 427 0011 Fax: (02) 418 6831



Windows Software

Public Domain and Shareware

Collection #1 $45 - 20 Windows programs for Microsoft Windows (2.01, 286 or 386) including: **Command Post** adds facilities to the MS-DOS executive window incl. user defined menus, prompting, windows arrange, hot key, screen blanking **Browser** view files in ascii, ansi, hex, fast searching, hide or reveal matching lines **Freemem** Icon dynamically displays free memory *(essential!)* **Firework** Windows version of Macintosh screen blanker **Blowup** capture any part of screen into clipboard *(used to create picture for this ad)* **Easel** View and convert pictures from Paint, Pbrush, Macintosh & GIF formats ***plus*** Mandelbrots, full featured drawing and layout program, disk examiner, 3D o's and x's, Digiclock, Tiler, Calpopup, Phone rolodex, Spy, Ghosts, Crumble, Printer & paginator and *more...*

Collection #2 ***NEW!*** $65 - 40 Windows programs for Microsoft Windows including a cassette cover designer, accounting program, programmers calculator, xtree-like utilities, music composer and tapedeck, Towers of Hanoi, Life, Macintosh Finder simulator, PC-Magazine windows benchmark program, desktop publishing utilities plus Windows games and lots of utilities. Write for our 3 page catalog, or take advantage of our special offer. Purchase both collections 1 & 2 for only $99 (over 60 Windows programs for use in Microsoft Windows!!).

Prices include shipping to your door.

Send Cheque/Money Order to

New Age WindowWare
33/75 Park Rd.
Middle Park VIC 3206.

FREE PROGRAM OF YOUR CHOICE !!!

WIDE RANGE OF QUALITY
SHAREWARE AND
PUBLIC DOMAIN SOFTWARE
(IBM and IBM COMPATIBLE)

COMPUTRON
P.O. BOX 627 WEST END Q 4101
PHONE (07) 830 8006

YES! Send me your FREE Catalogue and a FREE Program from the following selection (Business, Games, Education, Spreadsheets, Post Code Program and More)

MARKETPLACE

SOFTWARE SECURITY SLIDES

GAMES

AVAILABLE BY MAIL ORDER

	RRP	OURPRICE
BATTLECHESS	~~$61.95~~	$51.00
GRAND PRIX CIRCUIT	~~$55.00~~	$46.00
JACK NICKLAUS GOLF	~~$69.95~~	$46.00
OUTRUN	~~$69.95~~	$58.00

PLUS HUNDREDS MORE!
FOR C64, AMIGA, ATARI ST & AMSTRAD

Phone or write to: **JA MAIL**
(068) 82 6637
7 DAYS A WEEK
PO BOX 379 DUBBO NSW 2830

PUBLIC DOMAIN SHAREWARE

STANDARD VOLUMES FROM $5.00 *
SELECTED FILES AT $12.00 A DISCFULL
INCLUDES
- FILES FOR "C" PROGRAMMERS
Maestro Modems, CD ROM Disks,
Computer Books

WRITE OR CALL FOR FREE CATALOGUES
* Authors require a registration fee for continued use

DKR SOFTWARE
P.O BOX 372 BRIGHTON 5048
(08) 377 0049
Bulletin Board (08) 377 1067

SOFTWARE
Public Domain & Shareware

***$4.00* PER DISK**
5 1/4 - 360K format
EVERY 11th DISK FREE
NO MEMBERSHIP FEES
EXCELLENT RANGE OF PROGRAMS
SUITABLE FOR IBM & COMPATIBLES
3 1/2" (2 Programs) ***$9.00 per disk***
SEND $4.00 FOR CATALOGUE DISK AND FREE PROGRAM TO:
PD SOFTWARE SERVICES, 8 BENTLEY STREET, WANTIRNA VIC 3152
PLEASE INDICATE YOUR CHOICE OF FREE PROGRAM FROM THE FOLLOWING SELECTION:
PC-TUTOR GAMES SPREADSHEET POSTCODE PROGRAM

Lokmate Security Kit

THEFT DETERRENT FOR ALL COMPUTERS AND PERIPHERALS

USED BY BUSINESS, GOVT & EDUCATION

- Solid steel
- Fits most equipment
- Installs in minutes
- Link multiple units
- No drilling or tools required
- Attachs to 3 pieces of equipment

Unique Lokmate™ steel plates attach to any equipment using new hi-tech peel off adhesive Cable is wrapped around immovable object then passed through Lokmate™ plates and padlocked

KITS CONTAIN: 3 Metre heavy duty steel cable 3 x 110mm x 50mm steel plates and padlock

- Volume & Academic discounts
- Extra plates available
- Special kits for Mac

micro EXPANSION
PO Box 248 Riverwood NSW 2210
Ph 02-534 6355 Fax 02-53 9430

$59.95 Incl. Tax
Freight $6.00

RECYCLING SUPPLIES

- Reinking machines
- Reinking inks
- Fabric reloads & refill boxes
- Single colour and multicolour reloads
- Bulk ribbon (fabric and multistrike)
- Multistrike and correctable inserts
- Laser toner and recharging accessories

Dealer enquiries welcome

Lazarus Ribbons
70 Wolseley Rd
Mosman
NSW 2088
Tel: (02) 960 2737
(008) 24 9991
Fax: (02) 968 1276

HIGH RESOLUTION SLIDES FROM YOUR IBM OR MAC SOFTWARE

AUTHENTIC ADOBE POSTSCRIPT FILES

- Harvard Graphics
- Freelance Plus
- Applause II
- Corel Draw
- Micrografx
- Pixie
- TARGA Files
- Any SCODL File
- Scrapbook or Pict Files
- V.B.S. no. 5
- Power Point
- Persuasion
- And Many Others

- High Resolution 35mm Slides
- Fast Service
- Transfer Slides by Disk or Modem
- Imaged by Advanced Digital Film Recorders
In-house Film Processing

Slides From $7.00

Call us for your FREE Slide Imaging Kit and Trial Coupon
(03)699 6277
Visual Horizons Pty. Ltd.
4 10 Queensbridge Street South Melbourne Victoria, 3205

SLIDES AND OVERHEADS

35MM SLIDES
AND OVERHEADS
FROM YOUR PC'S
GRAPHIC SOFTWARE
FOR $10 OR LESS

PHONE (02)319 1877
FAX (02)698 5249

FFOTOGRAFF
79 MYRTLE STREET
CHIPPENDALE 2008

MARKETPLACE

HARDWARE

CAMS COMPUTERS

100 CHAPEL STREET, ST. KILDA VIC 3182
TELEPHONE: (03) 534 5625 FAX: (03) 534 5318

AT 386-25MHZ L/M:43.5MHZ
64KB CACHE MEMORY
- 2M RAM ON BOARD
- SOCKET 80287 / 80387
- 1.2M FDD & 1.44M FDD
- 40MB H/DISK (QUANTUM-12ms)
- MULTI I/O & VGA CARD
- 101 KEYBOARD
- TOWER CASE W/POWER SUPPLY

SPECIAL ..... $CALL

AT 386-20MHZ L/M:34 5MHZ
- 2M RAM ON BOARD
- SOCKET 80287 & 80387
- 1.2M FDD & 1.44M FDD
- 40MB H/DD V/C (QUANTUM-12ms)
- MULTI I/O & VGA CARD
- 101 KEYBOARD
- TOWER CASE W/POWER SUPPLY

ONLY ..... $CALL

AT386 SX-16MHZ
- 1M RAM ON BOARD
- 1.2M FDD
- 40MB H/DISK (28ms)
- MULTI I/O CARD
- VGA CARD-16BIT
- 101 KEYBOARD
- M/TOWER CASE W/P /SUPPLY

PRICE $2599

AT 286 "NEAT"-20MHZ
- 1M RAM ON BOARD
- 1.2M FDD
- 1.44M FDD
- 40MB H/DISK (28ms)
- MULTI I/O CARD
- VGA CARD - 16 BIT
- 101 KEYBOARD
- M/TOWER CASE W/P/SUPPLY

PRICE $2450

AT286-12 MHZ
- 1M RAM ON BOARD
- 1.2M FDD
- 20MB H/DISK
- MULTI I/O CARD
- VGA CARD
- 101KEYBOARD
- COMPAC CASE W/P/SUPPLY

PRICE $1659

PC/XT 4.77/12MHZ
- 640K RAM ON BOARD
- 360K FDD
- 720K FDD
- MULTI I/O CARD
- DUAL DISPLAY CARD
- 101 KEYBOARD
- BABY CASE W/POWER SUPPLY

PRICE $790

FLOPPY DRIVES
* 720K FDD (YE-DATA) $128
* 1.2M FDD (CHINON) $170
* 1.44M FDD (CHINON) $195

VIDEO DISPLAY CARD
* MEGA CARD (800 x600) $175
* OAK VGA CARD $250
* TRIDENT VGA CARD
- 16BIT W/256K RAM $299
* TRIDENT VGA CARD
- 16BIT W/512K RAM $359

HARD DISKS
* 20M W/CONT $440
* QUANTUM 42M KIT (12ms) $820
* QUANTUM 84M KIT (19ms) $1295

MONITORS
* NEC MULTISYNC 2A $730
* NEC MULTISYNC 3D $970
* NEC MULTISYNC 4D, 5D ..... $CALL

◊ PLEASE RING FOR ITEMS NOT LISTED! ◊ DEALERS ENQUIRIES ARE WELCOME! ◊
◊ ALL PRICES INCLUDE SALES TAX 12 MONTHS WARRANTY & FULL TECHNICAL SUPPORT ◊

MONASH INFORMATION SYSTEMS

1917 Dandenong Rd. Clayton. VICTORIA 3168.
PHONE: (03) 562 8214 FAX: (03) 543 4583

SYSTEM	RAM	MHz	L/M speed	PRICE
286-NEAT	1MB	16	21	$2900
386-SX	1MB	16	21	$3050
386-20	1MB	20	28	$3790
386-25	4MB	25	34	$4400
386-25C	4MB	25	40	$5700
386-33C	4MB	33	58	$6500

All systems include: * Support LIM EMS V.4 * 1.2MB FDD * 42MB V/C (28ms) HD * VGA Card * VGA Colour Monitor * 1Par/1Ser ports * 102 Enhanced Keyboard * Baby case *
*** 1 year Honeywell ON-SITE Warranty**

AT286-16MHz
* 1MB RAM * 1.2MB FDD * 20MB HD * 1P/1S/!G ports * 101 Keyboard * 8 Bit/ 256KB VGA Card * VGA colour monitor * Mini case ..... $ 2295

XT286-L/M 35MHz
* 640KB RAM * 360KB FDD * 20MB HD * 1P/1S/!G ports * 101 Keyboard * Dual Display Card * Mono monitor * Mini case ..... $ 1350

PLEASE CALL FOR BEST PRICES ON SOFTWARE AND OTHER ITEMS NOT LISTED

ALL PRICES INCLUDE SALES TAX & FULL 1 YEAR WARRANTY

LAPTOP BARGAIN

DLT-386S
- 386SX 16MHZ
- 1 MB RAM
- 40MB HDD
- 1.44MB FDD
- VGA/EGA LCD BACKLIT
- NI-CAD BATTERIES & ADAPTOR
- DOS 3.3 & GWBASIC
- CARRYING CASE
- DOCUMENTATION

$4895

41256 DRAM 100NS @ $3.50
ALSO OTHER 386 CLONES & ACCESSORIES
ALL PRICES INCLUDE SALES TAX E&OE

VENTURE SYSTEMS & ENTERPRISES
P.O. BOX 12198 A'Beckett St. Melbourne 3000
Phone (03) 725-4331 Fax: (03) 725-4331

▼ FUJITECH PERSONAL COMPUTERS PTY LTD *Making Computers More Affordable* ▼

XT 640K (4/12 Mhz)
2*360K JAPANESE FDD
DUAL DISPLAY CARD
I/O CARD (1 S,1 G,1 P)
101 KEYBOARD
MANUALS & CABLES
SMALL FOOTPRINT CASE
200W POWER SUPPLY
$750

AT (8/16 Mhz)
1MB RAM (EXP. TO 4Mb)
1.2 Mb JAPANESE FDD
DUAL DISPLAY CARD
I/O CARD (1 S,1 G,1 P)
101 KEYBOARD
MANUALS, CABLES
MINI FLIP-TOP CASE
200W POWER SUPPLY
$995

386SX (16/20 Mhz)
1 Mb RAM (EXP. TO 8 Mb)
1.2 Mb JAPANESE FLOPPY
40 Mb VOICE COIL HDD
VGA CARD
I/O CARD (1 SC1 G,1 P)
101 KEYBOARD
MANUALS, CABLES
FREE DOS/GW BASIC
SPECIAL **$2450**

386 (20/25 Mhz)
2 Mb RAM (EXP. TO 8 Mb)
1.2 Mb JAPANESE FLOPPY
40 Mb VOICE COIL HDD
VGA CARD (16BIT/512K)
I/O CARD (2 S,1 G,1 P)
101 KEYBOARD
MINI-TOWER CASE
MANUALS, CABLES
FREE DOS/GW BASIC
$3695

INTRODUCTORY SPECIAL
AT (16/20 Mhz)
1 Mb RAM (EXP. TO 8 Mb)
EMS/LIM 4 ON BOARD
VIDEO/SHADOW RAM SUPPORT
40 Mb VOICE COIL HDD
VGA CARD, 101 KEYBOARD
FREE MS DOS (4.01)
& GW BASIC
$2195

BUSINESS SPECIAL
AT (8/16 Mhz)
1 Mb RAM (EXP. TO 4 Mb)
1.2 Mb FDD, 40 Mb VC HDD
VGA CARD, 101 KEYBOARD
VGA MONITOR
EPSON PRINTER & STAND
FREE MS DOS (4.01) & GW BASIC
$2850

PERIPHERALS

EPSON PRINTERS FROM	$365
COMPUTER DESK FROM	$145
MODEMS (2400) FROM	$295
GENIUS MOUSE FROM	$105
TRACKBALL SYSTEM	$110
PRINTER STAND	$25
PRINTER RIBBONS	$15
PRINTER CABLES	$15
DISK BOXES FROM	$10
COPY HOLDERS	$35
JOYSTICK	$30
101 KEYBOARD	$90

DISKETTES

5.25 HD	$1.40 EACH
5.25 DD	$17 FOR 25
3.5 FROM	$2 EACH

SOFTWARE/BOOKS

WORD FOR WINDOWS	$550
PC TOOLS 6 (NEW)	$230
POWER C COMPLETE	$90
RUNNING MS DOS	$30
PHEONIX BIOS REF	$44
NORTON PROG'S GDE	$35
ADVANCED CLIPPER	$43

TWELVE MONTHS WARRANTY

WESTERN SUBURBS
101 CHARLES ST.
FOOTSCRAY
PH: (03) 689-9743
FAX: (03) 689-6063

EASTERN SUBURBS
542 STATION ST.
BOX HILL
PH: (03) 899-5950
FAX: (03) 899-5951

Australian Personal Computer

MARKETPLACE

HARDWARE

SMART PRINTER SHARING UNIT AUTO DATA SWITCH

PARALLEL 2 TO 1	95.00
PARALLEL 4 TO 1	169.00
PARALLEL 8 TO 1	244.00
SERIAL 4 TO 1	181.00
SERIAL 8 TO 1	269.00

MULTIPORT PRINTER BUFFER 256KB-2MB

PARALLEL 2 TO 2	454.00
PARALLEL 4 TO 2	520.00
SERIAL 2 TO 2	564.00
1 SERIAL 1 PARALLEL TO 1P 1S	564.00
5 SERIAL 5 PARALLEL MIXED MULTIPORT 512KB	1596.00
10 SERIAL 512KB	1580.00
10 PARALLEL 512KB	1544.00

10 PORT UNIT CAN BE NETWORKED

COMPUTER SYSTEMS
ZERO WAIT 386SX SYSTEM

386SX-CPU. 16 MHz-LANDMARK-21MHz 1 MB-RAM ON BOARD UP TO 8MB. TEAC 1.2MB FDD, 1:1 HDD/FDD CARD 101 KEY KEYBOARD, 2S, 1P, 1G I/O.
MINI TOWER CASE W/200W $1499.00
FREE 3 BUTTON MOUSE

386-20	$2450.00
386-25	$2950.00
VGA MONITOR	$780.00
42 MB VOICE COIL 28ms	$560.00
MARK II 2DD 3.5" DISKS	$16.99

MODEMS

TOPLINK AUTO1234/IN MODEM	245.00
MNP51234/IN MODEM	285.00
AUTO1234AD	282.00
MNP51234	345.00
POCKET AUTO 123 MODEM	225.00
AUTO 1234 MODEM	355.00
LAPTOP AUTO 2400 IN MODEM	298.00
SendFax MODEM 24/48	499.00
9600 BPS AUTO FAX CARD	559.00
PLUS AUTON	599.00
3 BUTTON MOUSE	60.00

ADD CARD

VGA 1024 X 768 OK	192.00
256K	279.00
512K	349.00
TEAC 1.2M FDD	129.00
TEAC 1.44M FDD	129.00

MEMORY

	120N	100N	80N
41464	2.89	3.07	—
41256	2.98	3.25	3.78
44256	—	12.50	14.00
511000		14.50	14.80
D-RAM MODULE SIPP 256 X 9	36.00	59.00	—

SALES TAX 20%

ALL OTHER PRICE INCLUDE SALES TAX
12 MONTHS WARRANTY
DEALERS ENQUIRIES ARE WELCOME

S. R ELECTRONICS CO
10 / 50 EVANS ST, MOONEE PONDS
VIC 3039, AUSTRALIA
TEL: (03) 3752274
FAX: (03) 3754384

HARD DRIVES
10 MB $199 20 MB $299
30 MB $399 44 MB V/C $599
65 MB V/C $749 80 MB V/C $1049
150 MB V/C from $1899
338 MB V/C from $2999
MFM • RLL • ESDI • SCSI
XT • AT • 386 • MAC

FLOPPY DRIVES
360K $130 720K $150
1.2 MB $175 1.44 MB $195

SYSTEMS
XTs $799 AT-12s $1399
80386-16SX Mini Towers $1999
80386-20s & 25s Call
Controllers from $99
Tape Drives from $399
NEC Monitors & CD ROM Drives
Mono/CGA/EGA/VGA Video Cards
Panasonic Printers

US MFD DISKETTES
360K $7.99 1.2 MB $19.99
720K $24.99 1.44 MB $59.99

PACIFIC RIM ENTERPRISES
P.O. Box 80, Redcliffe, Qld 4020.
Ph: (07) 203 8688 Fax (07) 203 6053

IBM STANDARD SOFTWARE CUSTOMISED TO YOUR NEEDS

- ELECTRONIC CASH BOOK
- SALES & STOCK SYSTEM
- CAR REPAIRS INVOICING
- MOTOR WRECKERS SYSTEM
- AIRCRAFT REPAIRERS SYSTEM

(075) 38 4466

QUADTECH AUSTRALIA PTY LTD

EPSON DEALS
(Like never before)
FROM AUSTRALIA'S *BIGGEST* EPSON DEALER

PC AX-2 VGA

SAVE $1585

- 40 Mb hard disk (voice coil).
- 1.2 Mb Drive.
- VGA Card & VGA Color monitor.
- DOS 3.30.
- 12 Months Warranty.

(Mono System as above $2695)

$3395

EPSON PC-E

- 20 Mb hard disk.360k drive.
- EGA Monitor and card.
- DOS 3.30
- 12 Months Warranty. (VGA system $2495)

$1995

SAVE $780

ONLY AVAILABLE FROM

DataParts
COMPUTER SOLUTIONS
519 BURKE RD, **CAMBERWELL** (03) 822 7895
30 CLARENCE ST, **SYDNEY** (02) 262 4553
13 EDWARD ST, **SHEPPARTON** (058) 21 7155
OFFER ENDS 20/5/90 OR UNTIL STOCKS LAST

Australian Personal Computer

MARKETPLACE

HARDWARE

RIBBON RE-INKING

	MONO	EGA	VGA
1) XT 12 MHZ 640K RAM 20MB HDD 360K FDD	$1200	$1700	$1800
2) AT 16 MHZ 1MB RAM 40MB V/C HDD 1.2MB FDD	$1800	$2350	$2400
3) AT 26 MHZ 1MB RAM 40MB V/C HDD 1.2MB FDD	$2100	$2800	$2900

(SERIAL / PARALLEL / GAME PORTS 101 KEY-BOARD)

STAR

NX 1000 WITH FREE CABLE	$375
NX 1000CL WITH FREE CABLE	$475

PANASONIC

KX P1180 WITH FREE CABLE	$375
KX P1124 WITH FREE CABLE	$575

ADD ON CARDS

EGA CARD 640*480 AUTO SWITCH	$175
VGA CARD 800*600	$230
DUAL MONO/CGA MODE CARD	$60
AT FDD/HDD CONTROLLER CARD	$150
MULTI I/O CARD FOR AT	$60

MONITORS

ECM 5400 EGA MONITOR	$575
ECM 5413 VGA MONITOR	$685
PAPER WHITE MONITOR	$199
NEC MULTISYNC 2A VGA MONITOR	$755
NEC MULTISYNC 3D 1028*768	$1099

MANUAL DATA SWITCH

SWITCH BOX 36 PIN AB	$50
SWITCH BOX 36 PIN ABC	$55
SWITCH BOX 36 PIN ABCD	$60
SWITCH BOX 25 PIN AB	$47
SWITCH BOX 25 PIN ABC	$52
SWITCH BOX 25 PIN ABCD	$57

OTHER

GENIUS GM6 + MOUSE (WITH DR HALO S/WARE + MOUSE PAD)	$80
GENIUS GM 6000 MOUSE (WITH DR HALO S/WARE + MOUSE PAD)	$90
QUICKSHOT II TURBO (COMMODORE + ATARI)	$20
QUICKSHOT II 3 FOR IBM	$26

DM *PERIPHERALS*

DEALERS ENQUIRIES ARE WELCOME!
45 Chatham Rd West Ryde NSW 2114
Pager Station: 925 3911 Pager No: 6133 Phone: (02) 858 4638 or 804 6648

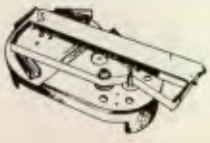
ALL PRICES INCLUDE SALES TAX

NEVER BUY ANOTHER RIBBON!!!

Over 100,000 sold since 1982. Macinker, the original, automatic ribbon re-inker pioneered the art of ribbon re-inking.

The Universal Macinker re-inks hundreds of different cartridge types with suitable adaptors. Extra dark, dot matrix lubricated ink yields a better than new print quality.

Satisfied customers Australia wide include Coles New World and Super K.Mart stores as well as hundreds of Schools and Universities and individuals.



AUSSOFT

Suite 1, 112 Bloomfield St.
Cleveland QLD 4163
Phone (07) 286 5590
Fax (07) 821 0000

DON'T THROW THAT RIBBON OR TONER CARTRIDGE AWAY.

THEY CAN BE MADE AS GOOD AS NEW FOR
ABOUT HALF THE COST OF A NEW ONE.

DO YOUR BIT FOR THE ENVIRONMENT
AND SAVE MONEY AS WELL

- We will re-ink your used "fabric" ribbons for HALF or less than a new one
- We will re-load your used ribbon cartridge with BRAND NEW ribbon for about 70% of new cost
- We will re-charge your Canon PC copier or laser toner cartridge for under $100.00

THAT'S NOT ALL FOLKS

We are licensed by
WORLD WILDLIFE FUND INTERNATIONAL
Proceeds from the sale of Ribbon Re-Inking services help Australian endangered species & their habitats.

So, what have you got to lose?
Help us to stop the throw away system
Help us to protect the worlds endangered species
Help yourself by saving real $ $ $ $

As Australia's FIRST and LARGEST commercial re-inking company with many years of experience, you are guaranteed a totally professional service

DON'T PROCRASTINATE, RING NOW!
(03) 459 9055 Fax (03) 459 7992 Pager: (03) 648 2137
THE RIBBON RE-INKING COMPANY
(A DIVISION OF EPOS SYSTEMS PTY LTD)

156-158 DOUGHARTY RD. WEST HEIDELBERG

WWF ©1986 World Wild-life fund International

DON'T THROW THEM AWAY

COMPUTER PRINTER CARTRIDGE & SPOOL RIBBONS

CAN BE RE-INKED!

Just like new - fraction of new price. Returned in sealed jackets.

- Top quality imported inks used w… lubricants for print wires
- Colour changes effected
- Worn ribbons replace… …ew tape
- Returned in seal… …bags
- Re-inked hist… …rded
- Hundred… …tied clients including: Govt … …schools, Co's throughout Aust.
- U… …me day processing

HALF PRICE IS TOO MUCH!

RIBBONS TO 13mm WIDE

1-2 cartridges	$5.50 ea
3-5 cartridges	$5.25 ea
6-10 cartridges	$5.00 ea
Over 11	$4.75 ea
Burroughs	$7.50 ea
4 Band Colour Ribbons	from $8.50 ea

COLOUR CHANGES $5 - PLUS INKING

RIBBONS OVER 13MM WIDE AND SPOOLS

All quantities	from $5.50 ea

MAINFRAMES

All quantities	from $8.00 ea
16" wide	from $12.50 ea

N.S.W. & S.A. plus 25 cents per cartridge
Q'land & W.A. plus 50 cents per cartridge
Colour changes & refabricing quoted

POST IN LIGHT BUBBLE PACK
Prices includes post both ways.

Post to:
Free Post 22 - Box 157, Kerang 3579
Phone: (054) 52 2877 a/h 52 2061
Bankcard/Mastercard/Visacard/facilities

Swifte Ribbon Re-Inking Computer & Acct. Services

MARKETPLACE

RIBBON RE-INKING — CONSUMABLES

Ink-Well
RE-INKING SERVICE
3 Gateway Drive, Labrador, Gold Coast, Australia, 4215
Phone: (075) 379 099 Fax: (075) 376 594

QUEENSLANDS PREMIER RIBBON RECYCLING COMPANY

Managed by ex-IBM Senior Engineer
Most Printer & Cash Register Ribbons Re-Inked
Including IBM 4234 & other Large Cartridges

- SUBSTANTIAL SAVINGS
- ALL WORK GUARANTEED
- HELP CONSERVATION & THE ECONOMY

PHONE NOW FOR A QUOTE

IBM + COMPATIBLES

- Workshop + field service
- 24 hr 7 day service to business users
- 24 hr turn around (parts allowing)
- Many C/O PCB + Power Supplies
- Importers of high quality IBM compatibles and specializing in small business
- Hardware & Software packages

Computer Bytes
1 KYNOCH STREET DEER PARK. VIC 3023
(03) 363 1304 018 346 500
Northern Victoria — Beechworth **(057) 28 7272**
AH: (03) 363 8615

BROWN DISC USA
High Quality American
DISKETTES
Double Confidence lifetime guarantee
3.5 inch DSDD DSHD
5.25 inch DSDD DSQD DSHD
Also boxes, 8 inch, labels, sleeves. Price list.
DISK EMPORIUM
79 Seven Hills Road, Baulkham Hills
NSW 2153
PO Box 780 Baulkham Hills
(02) 639 0615
TOLL FREE: 008 267 986

RE-INK YOUR PRINTER RIBBONS

Most fabric printer ribbons can be re-inked time and time again with exceptional **quality** and **savings**.

EASY, QUICK AND INEXPENSIVE

Use our "FREE POST" to mail your used ribbons to us — we re-ink them and return them as new for HALF THE PRICE of a new ribbon.

Ribbons are labelled and marked each time they are re-inked, giving you valuable cost saving information; ribbons are returned in a plastic envelope.

HOW DOES IT WORK?

1. Ring us and we will give you a FIRM quote for the cost of re-inking your ribbons.
2. Post your used ribbons to us at our expense:
   FREE POST 56,
   WEST COAST COMPUTERS,
   103 YARRA STREET,
   GEELONG. VIC. 3220.

— MINIMUM QUANITITY, 2 RIBBONS
— YOU DO NOT PAY FOR POSTAGE EITHER WAY

RE-CYCLING IS THE WAY OF THE FUTURE AND THE BENEFITS ARE ENORMOUS

WEST COAST COMPUTERS
103 Yarra Street Geelong Vic 3220
Ph (052) 23 1899 Fax (052) 21 2805

Ring for Laser Toner Re-charge

ALL PRICES EXCLUDE SALES TAX

	BULK 55¢ Made in USA and Japan		Nashua		BASF		Verbatim Datalife Plus Teflon*	
	10	100	10	100	10	100	10	100
5¼" DSDD	58c	55c	89c	89c	$1.39	$1.30	*$1.95	$1.75
5¼" DSHD	$1.30	$1.17	$2.20	$1.99	$2.40	$2.16	*$3.25	$2.95
							PRE-FORMATTED	
3½" DSDD	$1.30	$1.17	$2.20	$1.99	$2.50	$2.25	$2.95	$2.70
3½" DSHD	$3.32	$2.99	$4.95	$4.45	$5.50	$4.95	$6.95	$6.25

DISKWORLD
Top value Computer Supplies
Toll-Free order line 008 249 993 (in Sydney 488 9491)
or fax your order on -- (02)488 8299
Prices subject to change

Prompt, low-cost delivery
$4.00 for any size order
($6.00 in WA, Tas and NT)
MAIL ORDER
1st Fl 1394 Pacific Hwy
P.O. Box 449
Turramurra NSW 2074

MAIL ORDER COMPUTER PRODUCTS
Here is a small selection of our range: most book titles & software packages are available

Books

Understanding the AppleII	$29.95
Beneath Apple DOS	$29.95
Beneath Apple ProDos	$29.95
Using 1-2-3 Special Edition	$37.50
Desktop Publishing Bible	$37.50
MS DOS Bible	$36.00
dBASE III Plus Handbook	$35.00
1-2-3 Rel3 made Easy	$41.95
dBASEIV made Easy	$41.95

Add $3.50 postage per book

Disks

	Precision	Dysan
5.25in DS/DD	11.30	27.00
5.25in DS/HD	21.60	38.50
3.5in DS/DD	22.50	34.60
3.5in DS/HD	51.30	69.10

Software - Apple II

*Hitchhikers Guide	$10
*Breakers	$10
*Leather Goddesses of Phodus	$10
*Trinity	$10
*PFS File DOS3.3	$15
*PFS Report ProDOS	$15
*Bank Street Mailer	$15

Software - IBM

*PCFile (with manual)	$15
dBASE III Plus	$779
dBASE IV	$907
MicroSoft Works	$205
Microsoft WORD	$460
*Disk Technician Adv	$275
*KMAN/2	$750
*SCO Xenix V/386 OS	$950

*Super special price on current limited stock only.
Postage additional on all items.

RAM SUPPLY
PO Box 379 Toongabbie
NSW 2146
FAX: (02) 624 5433
Prices subject to change without notice.

ADVERTISERS' INDEX

ABS Systems 90
AB Security 167
Actek Systems 216
Advanced Group Innovations 181
ADV Technology 200
Alfa Computers 79
Allaw Sales ..... OBC
Altpro Systems 126
Amsacs ..... (MP)
Amstrad 89
Annabelle Bits 143,145,147
Arch Com Computers 211
ASP Microcomputers 205
AST Australia 26
Attache Software 37
Aussoft ..... (MP)
Australian Budget Computers 204
Australian Everex Systems 128
Australian Micro Systems 197
Autodesk 152
Automation One 125
Bitwise 166
Blue Chip 209
Borland 62,63,157
Brainware 113
Brightspark 201
Byte Comp Computers 218,223
CAD Connection 21
Cams Computers ..... (MP)
Capital Computer Equipment 141
Choice Marketing 203
Compuhelp 9
Computamart 17
Computer Bytes ..... (MP)
Computer Shark 77,98
Computer Supermart 122
Computron ..... (MP)
Cpec Computers 58,59
C C Data Computers 182
Datamate 169
Datamini 102
Dataparts ..... (MP)
Dick Smith Electronics 186,191
Digital Solutions 112
Discware 184,185
Diskworld Computer Supplies .. (MP)
Disk Emporium ..... (MP)
DKR Software ..... (MP)
DM Peripherals ..... (MP)
Electroboard 159
E.C.I ..... 25,2&3
Fotograph ..... (MP)
Fifth Generation Systems 64
FMS 127
Formosa Australia P/L 121
Fujitech ..... (MP)
GCS 149,150,151
Genus 139
George's Computer Store ... 176,177
Hackers Heaven 165
Hauppauge 31
Hearne Marketing 51
Hewlett-Packard 96
Hi-Q Technology 172
High Technology Comm. 210
Image Systems 61
Information Unlimited 189
Inkwell Re-inking ..... (MP)
Inspek 190
Integrated Memory Systems 154
Interlink 125
Johnson Technology 109
J.A. Mail ..... (MP)
J. Bond 76
K&A Software Engineering ..... (MP)
Kanica 155
Kinolith 115
Kookaburra Computers 104
Kyocera IFC,1
Lattice Logic 195
Lazarus Ribbons ..... (MP)
Logo Computer Centre 39
Maestro 171
Magnetic Tower ..... (MP)
Martot Computers 106
Mason's Electronics 162
Microbyte 13
Microgram 163
Microland 22,23
Microstar 91
Microway 42,138,197
Micro Educational 203
Micro Expansion ..... (MP)
Micro Sales 92,93
Mitac 146
Mitsui 43
Monash Information Systems .... (MP)
Nantucket 36
Nashua P/L 192
Natcomp Technology ... 32,33,34,35
National Panasonic 56
Nescom P/L 67
NetComm 29
New Age Window Ware ..... (MP)
NJS Components 206
Noble Systems 170
Olivetti/Triumph Adler 133
Pacific Rim ..... (MP)
PC Extras 19
PD Software ..... (MP)
Pei Chow 200
Pelham ..... (MP)
Peripheral Image ..... IBC
Peripheral Systems 103
Personal Cad Business Unit 118
Program Development Systems . 221
Quadtech ..... (MP)
Qualitech 221
Qualstar 158
Quarterdeck 48
Quotient ..... (MP)
Ram Supply ..... (MP)
RCM Software 175
Resolution Systems 158
Ribbon Re-inking Company ..... (MP)
Sage Australia 83,85
Samsung Information 11
Sancom Computers 178
Schmidt Electronics 198
Sigma Data 221
Skai 15
SME 144
Soft Talk 101
Software Support Services ..... (MP)
SR Electrics ..... (MP)
Stanilite Electronics 215
Star Micronics 73
Sun, Moon, Star Australia 137
Swifte Ribbon Re-inking ..... (MP)
Tech Pacific 71,105,188
Teco Australia 47
Texas Instruments 69
The Ultra Computer Company 53
Thomas Electronics 167
Topfly 72
Total Peripherals 41
Truimph Adler 135
Twinhead 142
Unique Micro Design 208
United Computer Group 127
Vapourware 212
Venture Enterprises Systems ..... (MP)
Verbatim 6
Veridata 30,55
Visual Horizons ..... (MP)
VKN Electronics ..... (MP)
West Coast Computers ..... (MP)
Wyse 45
Zylax Computers 119

The rumours, the embarassments and the bludners . . . Kester Cranswick makes sure you read about it first in Chip Chat.

There may be pitfalls with the new generation of upgradable PCs. A customer of Skai Computer Systems found that all might not be as he was promised. A year ago, he bought a 16MHz Skai Privilege AT-compatible, influenced by its ability to be upgraded to a 20MHz 386 and the company's promise to buy back the 286 chip.

So the customer thought that, with the trade-in of his existing board, an upgrade would not be that expensive. Wrong! He was told an upgrade would cost $1100 and that was for a board that did not have a cache controller. Skai suggested he might like to purchase a new motherboard, priced at just $2900.

"They've got you by the left ball," was his comment. As the original Skai Privilege ad stated, 'Skai has changed the rules of the game'.

In light of the ongoing litigation between Microsoft and Hewlett-Packard, there is a marked reticence on the part of HP staff to use the phrase 'look and feel'. One senior US employee told Chip Chat that HP's lawyers were insisting the expression be replaced with 'appearance and behaviour'. What was that about a rose by any other name?

The name of the game is score a free copy of a dBASE IV. Microland is giving away a copy of dBASE IV with every PC it sells; Discware will give you a copy if you buy a Kaypro PC; and Ivasoft will sell a copy for just $159 if you buy a Wyse PC. Chip Chat suggests that when you buy a PC, ask your dealer for a free copy of the program. If your demand is met, let us know so we can print a list of free dBASE IV suppliers.

Staff at PR firm Sinclair Barry found that one client left an annoying reminder of its business. The client was Samsung Electronics, and while it was using Sinclair Barry's services, it gave Telecom the impression that its phone number was that of Sinclair Barry. The result is what a disgruntled receptionist called thousands of calls for Samsung, which is no longer handled by the PR firm.

Toshiba has bought home the bacon in this month's MCP (male chauvinist pig) awards for sexist scripting at its Productivity Focus forums. While telling customers about the benefits of an application, the demonstrator quipped that the office secretary "thought a floppy disk was a back ailment."

Data Connection, a company specialising in direct marketing and mailshots, is so proud of its computer system that in a recent flier it made the grandiose claim that 'the computer technology can be compared to NASA'. Chip Chat feels obliged to point out that while NASA probably has more computers than the Federal Government, it has also had a fair share of computer errors. We hope Data Connection's claims about its marketing prowess are more acceptable.

One of the pre-election yarns in the *Melbourne Herald* concerned an opposition suggestion about replacing telephone directories with a computerised system based on the French Minitel system. Every good story deserves a picture, of course, and the picture was captioned 'Minitel . . . the computer telephone directory'.

Unfortunately, the picture showed a screen from Telecom's Electronic White Pages, a product which gives online access to a database of all directories. Was the picture editor trying to make a point to the Opposition, or was it simply a wrong number?

END

Reader submissions are always welcome — and we'll even pay you for them! Send your tips to Chip Chat, 122 Ormond Road, Elwood 3184.

Round the traps

Now that Digital Equipment Corp has its own PCs, expect this normally **media-shy organisation** to invest in some corporate image building in the manner of Big Blue. DEC US is already advertising on TV, realising its previous foray into PCs was hampered by poor brand name recognition. Rumour also has it that the company's elegant VMS operating system is being **recoded in C** with a view to porting to its RISC workstations.

Apple's local pricing for its **spellbindingly fast Mac IIfx** — $13,995 for a base model — left commentators speechless. At only 56 per cent more than the $US8969 American base price the only explanation seemed a massive fall in the Aussie dollar. But comparing **Apples with Apples**, a fully configured IIfx costs $19,125 locally and $US9869 in the States — almost double. Clearly the Australian base configuration is a little **more basic**. Perhaps Apple US includes a video card, monitor or keyboard?

Intel's monopoly of 386 and 486 chips generates more interest than the pork belly futures market. Latest on Intel's **running short list** is the 25MHz 386, currently flavour of the month. Not far behind is the 386SX, with swags more laptops and portables to be announced. Number One SX consumer is a surprise — sources say **IBM is buying more than Compaq**. Maybe a marketing push on the PS/2 Model 65 or a new portable is in the offing?

Chris Bowes

Bludners

The New South Wales Parliament has the right idea about at least one of the best-selling word processing packages around. In a recent ad in the *Sydney Morning Herald* it asked for expressions of interest in supplying text retrieval software that would load documents in WorkPerfect format.

Chip Chat suspects a typo, unless Greiner's minions are using taxpayers' money to develop a word processing format that only lets documents be saved if they have no spelling errors.

EXPRESSIONS OF INTEREST

FOR THE SUPPLY OF TEXT RETRIEVAL SOFTWARE

The Parliament of New South Wales plans to acquire an automated information retrieval system for its official publications. It is intended that the text retrieval software operate on the Unix Operating System.

The basic requirements of the software are:

- **sophisticated searching techniques.**
- **capable of free text searches.**
- **rapid retrieval of data.**
- **able to handle large volumes of full text data.**
- **able to load documents in WorkPerfect format.**

PERIPHERAL IMAGE

15 Stud Road, Bayswater, Victoria 3153. Telephone (03) 720 2444. Fax (03) 720 2325.

DISK DRIVES & CONTROLLERS TO SUIT XT/AT & COMPATIBLES

WESTERN DIGITAL HARD DISK KITS

- XT 20 Mb Internal* $399
- XT 40 Mb Internal* $649
- AT 20 Mb Internal* $569
- AT 40 Mb Internal* $699

Latest WD Drives with on-board controller.
All Kits include WD controllers, sliders, screws and installation guide.

DISK CONTROLLER CARDS

- WD XT GEN PC/XT Hard Disk Controller $99
- WD 1003 MM2 AT Hard/ Floppy Disk Controller $219
- WD 1006V MM2 AT 1:1 Interleave Hard/Floppy Disk Controller $239
- WD 1007A WA2 AT ESDI Hard/Floppy Disk Controller $510
- WD 1002A FOX XT/AT Floppy Disk Controller $125

Quantum AT HIGH PERFORMANCE HARD DISK KITS

- PRODRIVE 40*, c/w Interface Card Floppy Disk Controller and 64K CACHE $1,099
- PRODRIVE 80*, c/w Interface Card, Floppy Disk Controller and 64K CACHE $1,699

Average access time 19 ms.

2 YEARS WARRANTY

All Quantum kits include cables, sliders, screws and installation guide.

CHINON FLOPPY DISK DRIVES

- 360 Kb, 5.25" $139
- 1.2 Mb, 5.25" $159
- 720 Kb, 3.5" c/w 5.25" Mounting Kit $159
- 1.44 Mb, 3.5" c/w 5.25" Mounting Kit $189

DISK DRIVES TO SUIT APPLE II, IIe, IIgs AND MACINTOSH

WESTERN DIGITAL Prefernce™ HARD DISK DRIVES

- 20 Mb External, Model 20AP $999
- 40 Mb External, Model 40AP $1,299

2 YEARS WARRANTY

CHINON FLOPPY DISK DRIVES

- 800 Kb External, Model 354 (For Mac IISE & Plus) $349
- 143 Kb Internal, Model 851A (For Apple IIE) $129

TECO 40 Mb 286 LAPTOP

SPECIAL OFFER

$5,199

- 1 Mb RAM
- 40 Mb Hard Disk – 28 MS
- 16 MHz Zero Wait State
- 640 x 400 Gas Plasma Screen
- External EGA Port

BMC CORDLESS MOUSE

- 3-Button
- Microsoft Compatible
- incl. Software $175

Chicony KEYBOARDS

- CHICONY 101 XT/AT Tactile feel $101
- CHICONY 101 XT/AT 'Click' sound $131

Chicony MOTHERBOARDS Zero wait state

- AT 286 16 Mhz NEAT c/w 1 Mb RAM, Landmark 20 Mhz $1,350
- AT 386SX (P9) 16 Mhz c/w 1 Mb RAM $1,480
- AT 386 20 Mhz c/w 2 Mb RAM $2,600

OKI PRINTERS

- 320 9 Pin $685
- 321 9 Pin $865
- 390 24 Pin $949
- 391 24 Pin $1,209

PARADISE TECO COLOUR UPGRADE KITS TO SUIT XT AT 80286 & 80386

- EGA Monitor Kit 640 x 350 16 Colours $899
- VGA PLUS Monitor Kit $1,089
- VGA PLUS 16 Monitor Kit 640 x 480 256 Colours $1,199
- VGA Plus Multiscan Monitor Kit 640 x 480 16 Colours 800 x 600 16 Colours $1,259
- VGA Plus 16 Multiscan Monitor Kit, 640 x 480 16/256 Colours 800 x 600 16 Colours $1,359

All kits include Paradise graphics card, Teco monitor, power and video cables and software drivers.

PARADISE COLOUR GRAPHICS CARDS TO SUIT XT AT & COMPATIBLES

- Basic EGA $329
- EGA 480 Autoswitch $359
- VGA Plus $499
- VGA Plus 16 ..... $599
- VGA Professional $799

TECO MONITORS TO SUIT XT/AT

- VGA Paper White Mono 14" $249
- EGA Colour 14" $620
- VGA Colour 14" $699
- VGA Multiscan 14" $879

All monitors include power and video cables.

wangtek TAPE BACKUP

- 40 Mb Floppy Tape Internal Kit $599
- 60 Mb Internal Kit $1,199
- 150 Mb Internal Kit $1,399
- 60 Mb External Kit $1,799
- 150 Mb External Kit $2,199

All units include mechanism controller, Sytos software, all cables, sliders and screws, installation guide and one tape cartridge.

NetComm MODEMS

- Pocket Rocket $575
- 123 Inmodem $489
- 1234 Inmodem $599
- 123 Automodem $489
- 1234 Automodem $619
- 123 Smartmodem $645
- 1234 Smartmodem $859

Modems supplied with all cables and accessories.

DIGITAL RESEARCH SOFTWARE

- DR DOS Complete with GEM DESKTOP $99
- GEM Desktop $59
- GEM Desktop Publisher $359
- GEM Draw Plus $359
- GEM 1st Word Plus, inc. GEM Paint $239
- GEM Graph $359
- GEM Presentation Team $599
- GEM WordChart $239
- GEM Artline $599

OUR GUARANTEE TO YOU

All products are sourced from authorised Australian distributors and are supported locally by full manufacturers' warranties.

CALL IN TO OUR NEW SHOWROOM FOR A DEMONSTRATION BY OUR FRIENDLY STAFF!

THIS IS HOW TO ORDER:

CALL NOW!

ORDER HOTLINE 008 334 095

ENQUIRIES: (03) 720 2444

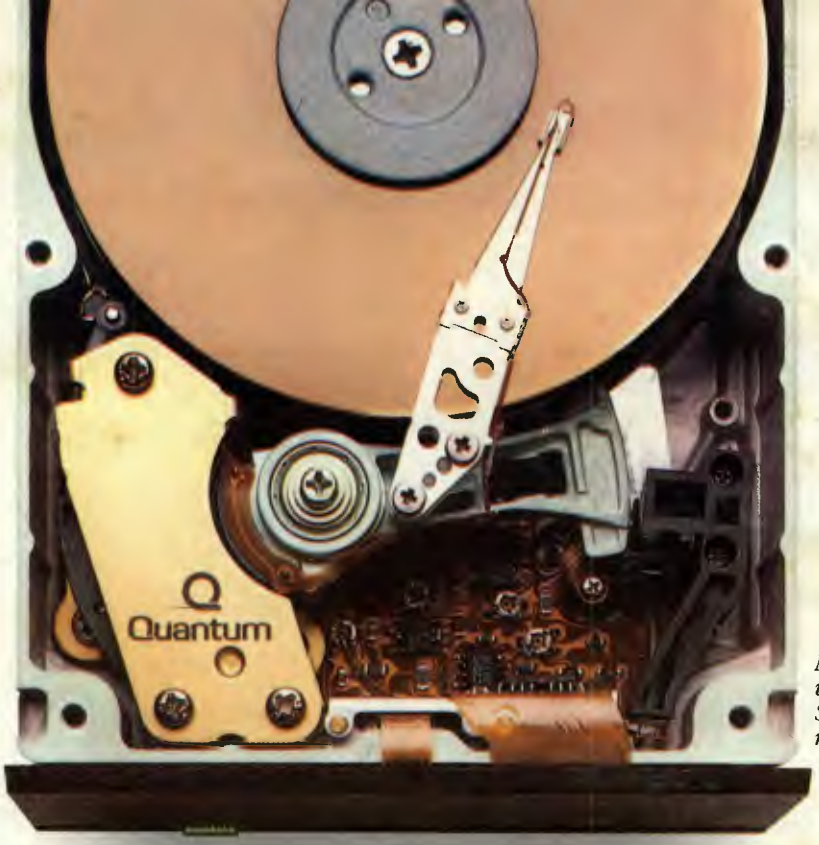
FAX: (03) 720 2325

- All products carry minimum 12 months warranty.
- All prices include State Sales Tax and may be subject to change without notice.
- Delivery charge $10.
- Overnight delivery wherever possible.

T & OE

BANKCARD MASTERCARD VISA

PI 012



Now look even better with the ProDrive Series 120 and 170 megabyte version.

Presenting A 3½" Drive With The Intelligence To Make You Look Good.

Quantum's new ProDrive Series™ of hard disk drives is so smart, you'll look good just asking for one.

Because a ProDrive™ disk drive is loaded with clever features like AT-Bus and SCSI interfaces. And Quantum's DisCache® data-buffering scheme. Which reduces access time in many cases from 19 to 12 ms. ProDrives™ also offer 50,000 hour MTBF and are available in 42, 84, 105, 120, and 170 megabyte capacities.

What's more, they work with IBM™ compatible systems and Macintosh.™

Just as Allaw works with your service needs. Because we have more of the Quantum ProDrive Series than anyone. Ready to ship now.

Call Allaw for Quantum's ProDrive today. You'll be looking better in no time at all.

*ProDrive Series and ProDrive are trademarks and *DisCashe is a registered trademark of Quantum Corporation.
*IBM is a trademark of International Business Machines, Inc.
*Macintosh is a registered trademark of Apple Computer, Inc.

STAY AHEAD OF THE MARKET. WITH ALLAW.

• SYDNEY (02) 406 9111 • MELBOURNE (03) 561 8644

ALLAW DATA STORAGE MUSCLE